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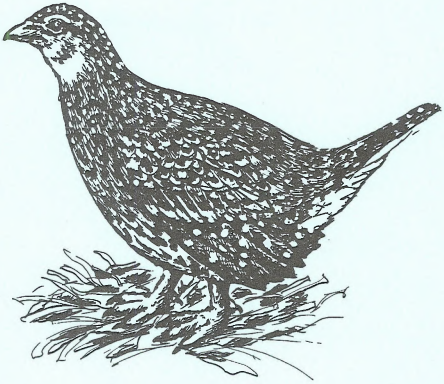
Vegetation of the Hixon Columbian Sharp-Tailed Grouse Habitat Management Plan Area, Washington County, Idaho



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VEGETATION OF THE HIXON COLUMBIAN SHARP-TAILED GROUSE HABITAT MANAGEMENT PLAN AREA, WASHINGTON COUNTY, IDAHO

by

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Conservation Data Center

February 1997

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Prepared for:
Bureau of Land Management
Lower Snake River District
Cascade Resource Area

Abstract

The Hixon Columbian Sharp-tailed Grouse Habitat Management Plan Area supports the largest and one of the last known populations of Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) in western Idaho. The Bureau of Land Management manages the 27,740 acre area cooperatively with the Idaho Department of Fish and Game and The Nature Conservancy. The need for a vegetation map of the area to help land managers had been previously identified. Our primary objective was to inventory, classify, and map the distribution of plant communities of the Habitat Management Plan area.

We identified 24 plant community types within the project area, several of which are either poorly or undescribed in regional classifications. We conducted a limited amount of vegetation sampling to help characterize the composition and structure of some of the community types. Classification for the vegetation map is based on 13 cover types grouped into six habitat classes - sagebrush, grassland, scabland, mountain shrub, conifer forest, and riparian. The most common cover type is xeric sagebrush, covering roughly 34% of the project area. It is followed by the rock buckwheat (24%), bluebunch wheatgrass (17%), mountain shrub (9%), and bulbous bluegrass (7%) cover types. Each of the other eight cover types provide less than 5% coverage. We also assigned ecological condition ranks to selected cover types. The vegetation map is comprised of 154 polygons, ranging in size from about 1,879 to 8 acres, with a mean of 177 acres. The vegetation map is in both a GIS and non-GIS format at a scale of 1:24,000.

Two populations of squawapple (*Peraphyllum ramosissimum*), a BLM Sensitive plant species were revisited and information about them updated. No new populations of squawapple or other rare plants were discovered. We also updated vegetation information and assessed the conservation status of Buckwheat Flats Research Natural Area (RNA).

Acknowledgments

We would like to thank Jack LaRocco for his initiation and support of this project. We also thank Linda Williams and Andrew Pitner for their help with the vegetation sampling, and Lawrence Hartpence for producing the GIS-generated vegetation map. The Nature Conservancy provided funding for digitization and production of the GIS version of the vegetation map.

Table of contents

Abstract I
Acknowledgments I
Table of contents ii
List of figures iii
List of tables iii
List of appendices iii

The Hixon Columbian sharp-tailed grouse Habitat Management Plan Area
Introduction 1
Location 1
Physical setting 1
Geology 4
Soils 4
Climate 4
Vegetation 5

A vegetation map for the Hixon Columbian sharp-tailed grouse Habitat Management Plan Area
Methods 7
Vegetation map cover type descriptions 8
Organization of the vegetation map 16
Ecological condition assessment 17
Polygon descriptions 20

Vegetation sampling 30
Rare plants 31
Buckwheat Flats Research Natural Area 34
Sharp-tailed grouse observations 36

References 37

List of figures

Figure 1. Location of the HMP Area in Idaho 2
Figure 2. General location and boundaries of the HMP Area 3
Figure 3. Locations of *Peraphyllum ramosissimun* within the HMP Area 32
Figure 4. Location of Buckwheat Flats RNA 35

List of tables

Table 1. Plant community types occurring within the HMP Area 6
Table 2. Cover types for the HMP Area vegetation map 9
Table 3. Cover type frequencies for the HMP Area vegetation map 18
Table 4. Total and relative extent, and average polygon size for the vegetation map cover types 19
Table 5. Plant community types sampled in the HMP Area 31

List of appendices

Appendix 1. Locations of leafy spurge (*Euphorbia esula*) within the HMP Area.
Appendix 2. Size, cover type, inclusions, and ecological condition summary for the vegetation map polygons.
Appendix 3. Average cover and constancy values for six community types in the HMP Area.
Appendix 4. Location of vegetation plots in the HMP Area.
Appendix 5. Western Heritage Task Force plot forms II and III.
Appendix 6. Element Occurrence Records for *Peraphyllum ramosissimum* in the HMP Area.
Appendix 7. Location of sharp-tailed grouse observations in the HMP Area.

THE HIXON COLUMBIAN SHARP-TAILED GROUSE HABITAT MANAGEMENT PLAN AREA

Introduction

The Hixon Columbian Sharp-tailed Grouse Habitat Management Plan Area (HMP Area) supports the largest and one of the last known populations of Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) in western Idaho. The grouse is a Bureau of Land Management (BLM) Sensitive Species, an Idaho Department of Fish and Game (IDFG) Species of Special Concern, and on the U.S. Fish and Wildlife Service's Species of Concern list (Conservation Data Center 1996). The BLM manages the HMP Area cooperatively with the IDFG and The Nature Conservancy (TNC). The primary cooperative objectives are to manage the HMP Area for good to excellent habitat conditions and a corresponding population of 300-400 Columbian sharp-tailed grouse (Bureau of Land Management 1994). The population has maintained a spring count of approximately 100 birds over the past several years.

The BLM completed its Hixon Columbian Sharp-tailed Grouse Habitat Management Plan in 1994 (Bureau of Land Management 1994). One of the planned actions scheduled for 1996 was to produce a vegetation map for the HMP Area. To satisfy this planned action, the BLM and the IDFG's Conservation Data Center (CDC) entered into a cooperative Challenge Cost-share agreement. Our primary objective was to inventory, classify, and map the distribution of plant communities within the HMP Area.

A coarse-scale vegetation map was completed for the southeastern corner of the HMP Area in 1987 as part of a Columbian sharp-tailed grouse habitat selection study (Marks and Marks 1987). A complete and finer-scale vegetation map for the HMP Area is necessary to help implement management decisions concordant with the HMP goals of improving sharp-tailed grouse habitat and increasing population numbers. As part of the vegetation map, another objective for the CDC was to catalog the plant communities and their ecological condition in this special management area. Our other project objectives were to map and evaluate populations of squawapple (*Peraphyllum ramosissimum*), a BLM Sensitive plant species known to occur within the HMP Area, and to assess the conservation status of the Buckwheat Flats Research Natural Area (RNA). Implementation of the HMP is also meant to benefit sensitive species such as squawapple, and add a measure of protection to the portion of the Buckwheat Flats RNA within the HMP Area boundaries (Bureau of Land Management 1994).

Location

The HMP Area is located in west-central Idaho, approximately 15 miles north of Weiser, in Washington County (Figures 1 and 2). It encompasses approximately 27,740 acres, of which 19,730 are administered by the BLM and 8,010 are privately owned. The Payette National Forest borders the HMP Area to the north and northwest along the southern flanks of the Hitt Mountains. Private lands border the southwestern, southern and eastern boundary lines. State Highway 95 passes within one mile of the HMP Area's southern boundary. The Mann Creek road provides the only direct public access into the HMP Area.

Physical setting

The HMP Area is characterized by rolling broken terrain dissected by several minor to larger-sized drainages. Steep areas are associated with slopes descending the broad ridges to the drainage bottoms. Mann, Sage, and Keithly creeks are the main stream systems, and generally flow in a north to south

Figure 1. Location of the HMP Area in Idaho

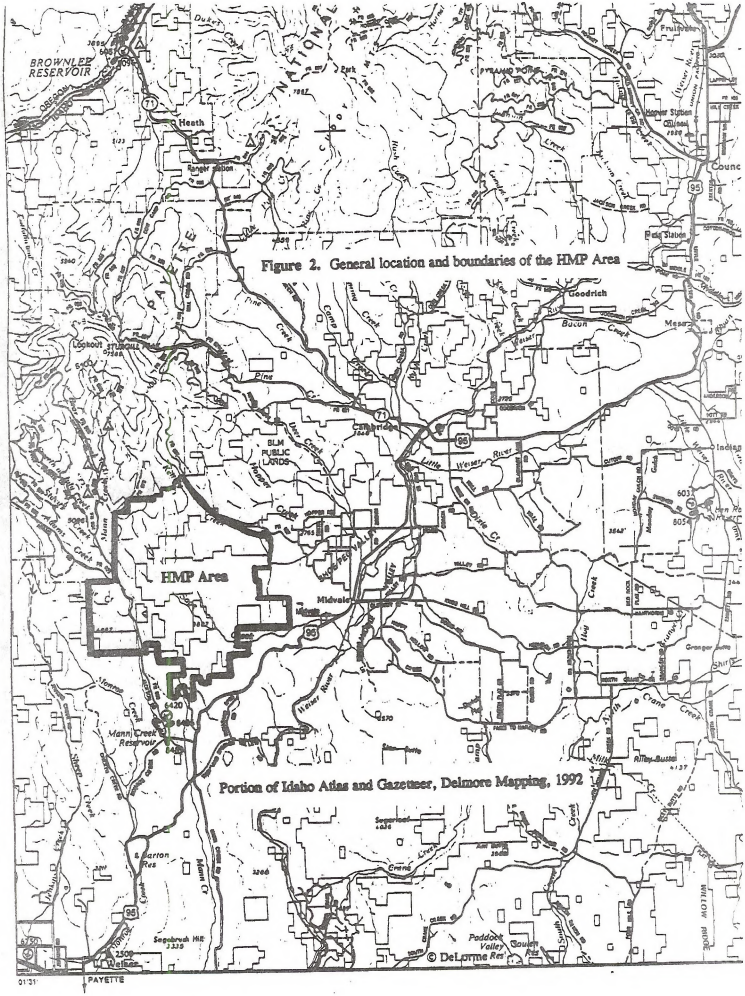


Figure 2. General location and boundaries of the HMP Area

direction through the HMP Area. The uplands also trend north to south, but a diversity of aspects are provided by the many knolls and intersecting spur ridges. Elevations range from approximately 5,400 feet in upper Sage Creek to 3,100 feet along Mann Creek.

The HMP Area is located within Bailey's Blue Mountain section (M332G) of the Middle Rocky Mountain Steppe - Coniferous Forest - Alpine Meadow Province described by McNab and Avers (1994). Using other classifications, the HMP Area is located within the Wallowa-Seven Devils Section of the Columbia Intermontane Province (Ross and Savage1967), and Blue Mountain Ecoregion (Omernik and Gallant 1986). It is part of the Columbia Division - Weiser Unit of the Idaho Floristic Region classification (Ertter and Moseley 1992).

Geology

The HMP Area is underlain by the Miocene-aged Columbia River Basalt Group flows. It is located within a geologic area known as the Weiser embayment, the southeastern most extension of the Columbia Plateau. Following vulcanism, pronounced structural activity occurred throughout the embayment. The Weiser Basalt units in the Mann Creek area were uplifted as the Sturgill Peak block and anticline continued to rise. The area has a northeastern alignment, paralleling the Snake River fault system (Fitzgerald 1982). There are inclusions of arkosic sandstone and fine-grained volcanoclastic rocks within the HMP Area, mainly along the steep slopes above Mann Creek (Mitchell and Bennett 1979).

Soils

Most soils in the HMP Area formed in a thin loess mantle over basalt residuum. Development of some of the deeper soils also includes colluvial material. Most are classified as Argixerolls. Gem-Reywat-Bakeoven, and Riggins-Meland soil unit groups dominate the HMP Area uplands. These main soil units vary from very shallow to moderately deep, and gently to steeply sloping. All are well-drained. Soil profiles are stony, at least in the upper layers, and loams are the main textural class. Clay accumulations are typical for these soils. Other soil units such as Klicker, DeMasters, Deshler, Midvale, Haw, and Gross are less abundant and widely distributed. Alluvial soils of the stream bottoms show little profile development and are derived mainly from the dominant basalt rock (Soil Conservation Service 1992).

We compared our vegetation map with the Soil Conservation Service's (1992) soil survey map for the HMP Area and found several consistent relationships. Xeric sagebrush (*Artemisia tridentata* ssp. *xericensis*) communities are nearly exclusively associated with Gem-Reywat, Riggins, Meland-Riggins, and to a lesser extent Gem and Gross soil units, while low sagebrush (*Artemisia arbuscula*) commonly occurs within the clayey Gem soil units. Scabland vegetation occurs in the shallow Bakeoven and Riggins, and to a lesser extent Gem-Reywat soil units. Canyon grasslands are associated with the Riggins soil unit. Large mountain shrubfield communities are primarily associated with Meland-Riggins and Klicker soil units, and Douglas-fir (*Pseudotsuga menziesii*) stands with Klicker, DeMasters, and Meland soil units (Soil Conservation Service 1992).

Climate

From late fall to early spring, the climate of west-central Idaho is typically influenced by cool and moist Pacific maritime air. Periodically, this westerly flow is interrupted by outbreaks of cold, dry, continental air from the north. During the summer and early fall months, a Pacific high pressure system dominates

weather patterns, resulting in minimal precipitation and more continental climatic conditions overall (Ross and Savage 1967). Weather data from Weiser, about 15 miles to the south, reflects general climate trends for the HMP Area. At Weiser, 49% of the average 12.4 inches (316 mm) of annual precipitation falls during the November through January winter months. Most of this would be snow in the HMP Area. There is another spike of increased precipitation during May and June before the dry summer begins, when only 14% of the average annual precipitation falls from July through October. The average annual temperature at Weiser is 54.2° F (11° C), with December being the coldest and July the warmest months of the year (Johnson 1981). Because it averages over 1000 feet higher elevation, average temperatures are lower and precipitation higher within the HMP Area compared to Weiser.

Vegetation

The vegetation of the HMP Area is comprised of a mosaic of sagebrush, scabland, mountain shrubfield, grassland, conifer, and riparian plant communities. This mosaic largely parallels differences in aspect, soil type, and disturbance patterns. Sagebrush-steppe vegetation covers a majority of the rolling uplands. Xeric sagebrush (*Artemisia tridentata* ssp. *xericensis*) is the main tall sagebrush species, with antelope bitterbrush (*Purshia tridentata*) being a prominent associate in most places. Grassland vegetation is most extensive where fire has killed the sagebrush and antelope bitterbrush. Climax grasslands occur on dry, rocky, steep slopes in the major drainage canyons. Bluebunch wheatgrass (*Agropyron spicatum*) is the main bunchgrass in all late seral condition sagebrush and grassland habitats. Interestingly, Idaho fescue (*Festuca idahoensis*) is uncommon, being limited to a few north-facing slopes. Bulbous bluegrass (*Poa bulbosa*) is the primary invasive grass throughout the HMP Area. It is an introduced perennial species that dominates all early seral vegetation, and is well established in many mid-seral stands as well.

Many ridgecrests and other rocky, shallow soil sites support a sparse, low-growing vegetation. High rock cover characterizes all of these scabland areas. Rock buckwheat (*Eriogonum sphaerocephalum*) is the most common of the several scabland community types. They comprise the second most common vegetation class within the HMP Area. Sandberg's bluegrass (*Poa secunda*) and/or bulbous bluegrass are the main scabland grasses. Areas with very clayey soils occur along many of the bottomlands and often support low sagebrush (*Artemisia arbuscula*) communities. Inclusions of low sagebrush occur in upland areas, but are much less common than scabland vegetation. The preliminary vegetation cover type map outlined in the HMP (Bureau of Land Management 1994) appears to grossly overestimate the amount of low sagebrush, especially in the northern and western portions of the HMP Area.

Deciduous mountain shrub communities are interspersed throughout the HMP Area and support a diverse suite of tall to low shrubs. They are best developed in draws, slope concavities, and along the brows of many northerly- and easterly-facing slopes. The rose family (Rosaceae) is well represented, with bittercherry (*Prunus emarginata*) or chokecherry (*Prunus virginiana*) being common community dominants. Douglas-fir (*Pseudotsuga menziesii*) stands occur on mesic aspects at the higher elevations, but are more extensive on adjacent Forest Service lands. Narrow bands of black hawthorne (*Crataegus douglasii*)- or mountain alder (*Alnus incana*)-dominated riparian vegetation occur along most watercourses. A small portion of the HMP Area has been seeded to intermediate wheatgrass (*Agropyron intermedium*).

We identified 24 plant community types within the HMP Area (Table 1). Twenty of the types are based on descriptions in various published classifications, while four are not yet part of any regional classification. The bulbous bluegrass type is the only one that is clearly an anthropogenic type. It occurs as a very

Table 1. Plant community types occurring within the HMP Area.

Name	[1]Ref.
Sagebrush shrubland	
1. Xeric sagebrush/bluebunch wheatgrass (*Artemisia tridentata* ssp. *xericensis/Agropyron spicatum*)	1
2. Xeric sagebrush/Idaho fescue (*Artemisia tridentata* ssp. *xericensis/Festuca idahoensis*)	1
3. Basin big sagebrush/basin wildrye (*Artemisia tridentata* var. *tridentata/Elymus cinereus*)	1
4. Low sagebrush/Sandberg's bluegrass (*Artemisia arbuscula/Poa secunda*)	1
5. Low sagebrush/bluebunch wheatgrass (*Artemisia arbuscula/Agropyron spicatum*)	1
6. Low sagebrush/Idaho fescue (*Artemisia arbuscula/Festuca idahoensis*)	1
7. Antelope bitterbrush/bluebunch wheatgrass (*Purshia tridentata/Agropyron spicatum*)	1
Grassland	
8. Bluebunch wheatgrass-Sandberg's bluegrass/arrowleaf balsamroot (*Agropyron spicatum-Poa secunda/Balsamorhiza sagittata*)	2
9. Idaho fescue-bluebunch wheatgrass (*Festuca idahoensis-Agropyron spicatum*)	2
10. Bulbous bluegrass (*Poa bulbosa*)	none
Scabland	
11. Rock buckwheat/Sandberg's bluegrass (*Eriogonum sphaerocephalum/Poa secunda*)	3
12. Thyme-leaved buckwheat/Sandberg's bluegrass (*Eriogonum thymoides/Poa secunda*)	3
13. Stiff sagebrush/Sandberg's bluegrass (*Artemisia rigida/Poa secunda*)	2
14. Gray's biscuitroot/Sandberg's bluegrass (*Lomatium grayi/Poa secunda*)	none
Mountain shrubland	
15. Mountain shrub	none
16. Talus-shrub garland	4
17. Mallow ninebark (*Physocarpus malvaceus*)	4
Conifer forest	
18. Douglas-fir/common snowberry (*Pseudotsuga menziesii/Symphoricarpos albus*)	5
19. Douglas-fir/mallow ninebark (*Pseudotsuga menziesii/Physocarpus malvaceus*)	5
20. Douglas-fir/pinegrass (*Pseudotsuga menziesii/Calamagrostis rubescens*)	5

(Table 1. continued)

Name	[1]Ref
21. Grand fir/white spirea *(Abies grandis/Spiraea betulifolia)*	5
Riparian	
22. Black hawthorne *(Crataegus douglasii)*	none
23. Mountain alder/water birch *(Alnus incana/Betula occidentalis)*	6
24. White alder/syringa *(Alnus rhombifolia/Philadelphus lewisii)*	6

[1]References (Ref.) used to classify the vegetation are: 1 = Hironaka et al. (1983); 2 = Tisdale (1986); 3 = Daubenmire (1970); 4 = Johnson and Simon 1987; 5 = Steele et al. 1981; 6 = Miller (1976).

early/early seral condition community in degraded xeric sagebrush, antelope bitterbrush, and bluebunch wheatgrass habitat types. The cover type names used for the vegetation map are more inclusive and often encompass more than one community type. Plant nomenclature follows Hitchcock and Cronquist (1973) for most species.

There was a pronounced difference in the ecological condition of the unburned vegetation located within the "Hixon Preserve Field" exclosure versus adjacent areas open to livestock grazing. Plant communities within the exclosure were commonly more diverse and in a more advanced seral stage. In 1989, over 30% of the HMP Area was burned by wildfire (Bureau of Land Management 1994), mostly in the Sage Creek drainage. The fire eliminated large areas of sagebrush and antelope bitterbrush coverage. Overall, we saw little regeneration of these shrubs during our 1996 survey work. Bluebunch wheatgrass is common in places, but in most burned areas, the present grassland vegetation is dominated by bulbous bluegrass and annual bromes.

Noxious weeds are not that well established within the HMP Area yet. A few small, scattered populations of leafy spurge (*Euphorbia esula*) were observed and have been mapped (Appendix 1). This species is rapidly expanding its range in Washington County, and prompt control, including periodic inventories, will be important to prevent further establishment within the HMP Area. Hoary whitetop (*Cardaria draba*) is more widespread, but seems to be concentrated around the Fairchild Reservoir and associated ditchway areas. Scotch thistle (*Onopordum acanthium*) or other thistle species (*Cirsium* spp.) are locally common in several disturbed areas. We did not observe any knapweed (*Centaurea* species) populations. However, most disturbed areas prone to knapweed invasion were visited early in the season, prior to the time species in this group flower.

VEGETATION MAP FOR THE HIXON COLUMBIAN SHARP-TAILED GROUSE HABITAT MANAGEMENT PLAN AREA

Methods

The vegetation map for the HMP Area is based on the field inventory method. Surveys were conducted by

hiking through as much of the HMP Area as possible. Access was gained using the Mann Creek, East Fork Deer Creek, Fairchild Reservior/Sage Creek, and Keithly Creek road networks. Field work was conducted between May 21 - June 10 and August 12 - 13, 1996. The boundaries of a particular vegetation unit were delineated in the field onto a clear acetate overlay taped to the appropriate 1:24,000 scale color aerial photograph. The aerial photographs used for this project were taken for the BLM on July 31, 1987, under identification code ID-87BC. Photos 6-7-11 to 13, 6-8-20 to 25, 6-9-20 to 24, and 6-10-21 to 24 provide stereoscopic coverage for most of the HMP Area. Vegetation and other notes necessary for classification were recorded into our field notebooks. These notebooks are on file at the CDC office in Boise.

After completing our field work, polygons delineated on aerial photos were refined and transferred to 1:24,000 orthophoto maps. These were then traced onto 1:24,000 U.S.G.S. topographic quadrangles and provide the template for GIS digitization. The vegetation map comprises portions of four 7.5' U.S.G.S. topogrpahic quadrangles - Hopper Creek, Mann Creek NW, Midvale Hill, and Sturgill Peak. The vegetation map exists in two formats. One is a color- and numerically-coded GIS generated map, and the other consists of numerically-coded polygons drawn onto the four U.S.G.S. topographic quadrangles covering the HMP area. The scale of both formats is 1:24,000.

The vegetation map classification is based on existing cover types reflecting a site's actual vegetation. We used floristic, structural, and to a lesser extent wildlife habitat criteria to devise the cover type classification. Cover type circumscription is based on published classifications as much as possible (see Table 1). Each polygon (vegetation mapping unit) on the map has been assigned a primary cover type. Polygon boundries were delineated largely on the basis of vegetation pattern homogeneity, although large homogenous blocks of vegetation are uncommon due to frequent changes in topography and soils. Because of this, the majority of polygons are comprised of more than one cover type. The typical pattern is to have a polygon dominated by one cover type, but containing one or more other cover type inclusions. These inclusions are noted in the polygon descriptions and in Appendix 2. Because of their importance as sharp-tailed grouse habitat, inclusions of the mountain shrub and black hawthorne cover types are depicted on the vegetation map as well as being noted in the polygon description. A designated symbol (•) shows the occurrence of mountain shrub and black hawthorne inclusions on the hard copies of the vegetation map.

Cover types are described from field surveys, supplemented by a limited amount of selective vegetation sampling. In addition, the ecological condition of many sagebrush, grassland, and scabland communities was assessed during field surveys. This information is noted in the polygon descriptions section and in Appendix 2.

Vegetation map cover type descriptions

The HMP Area vegetation map consists of 13 cover types grouped into six habitat classes - sagebrush, grassland, scabland, mountain shrub, conifer forest, and riparian (Table 2). Each cover type has a six letter code used in the polygon descriptions. The codes are derived from the scientific name of the cover type's dominant species. Aquatic habitats such as reservoirs and stock ponds are not considered in this classification.

Sagebrush cover types

Xeric sagebrush (*Artemisia tridentata* ssp. *xericensis*: ARTTRX) - The presence of xeric sagebrush with a

Table 2. Cover types for the HMP Area vegetation map.

Name	Code
Sagebrush	
1. Xeric sagebrush cover type (*Artemisia tridentata* ssp. *xericensis*)	ARTTRX
2. Low sagebrush cover type (*Artemisia arbuscula*)	ARTARB
Grassland	
3. Bluebunch wheatgrass cover type (*Agropyron spicatum*)	AGRSPI
4. Bulbous bluegrass cover type (*Poa bulbosa*)	POABUL
5. Intermediate wheat cover type (*Agropyron intermedium*)	AGRINT
Scabland	
6. Rock sagebrush cover type (*Eriogonum sphaerocephalum*)	ERISPH
7. Thyme-leaved buckwheat cover type (*Eriogonum thymoides*)	ERITHY
8. Gray's lomatium cover type (*Lomatium grayi*)	LOMGRA
Mountain shrub	
9. Mountain shrub cover type	MTSHRUB
Conifer forest	
10. Douglas-fir cover type (*Pseudotsuga menziesii*)	PSEMEN
Riparian	
11. Black hawthorne cover type (*Crataegus douglasii*)	CRADOU
12. Mountain alder cover type (*Alnus incana*)	ALNINC
13. White alder cover type (*Alnus rhombifolia*)	ALNRHO

graminoid-dominated understory distinguishes this cover type. Antelope bitterbrush is often prominent and in some cases equals or surpasses the coverage of xeric sagebrush. In older stands that have escaped recent fires, the antelope bitterbrush is often taller than the xeric sagebrush. Canopy cover of the two shrubs varies from greater than 50% to less than 10%, and is commonly in the 10%-20% range. Dense stands tend to be local and scattered within the more open areas. The only other upright shrub that commonly occurs within this community is gray rabbitbrush (*Chrysothamnus nauseosus*).

Bluebunch wheatgrass is the primary bunchgrass in late and mid-seral communities. Squirreltail (*Sitanion hystrix*) can be common in places and is likely indicative of a more mid-seral condition. Bulbous bluegrass dominates large areas with an early seral understory. It is also abundant in many mid-seral communities.

Other introduced grasses such as the annual bromes (*Bromus* spp.) can also be common in all but late seral communities. Most polygons contain a mosaic of successional stages that probably parallel the livestock grazing and fire history of the area. Idaho fescue does not occur in this cover type except locally on a few north-facing slopes. Native forb diversity is greater in mid- and late-seral communities. Forbs such as balsamroot (*Balsamorhiza sagittata*), spurred lupine (*Lupinus laxiflorus*), and common yarrow (*Achillea millefolium*) are usually present even in disturbed areas.

Xeric sagebrush is the most common cover type in the HMP Area. It is also a common inclusion within the other map cover types, especially on deeper soils pockets within the various scabland types, and as the matrix between tall shrub patches characterizing many mountain shrub communities. Nearly all of this cover type is representative of the *Artemisia tridentata* ssp. *xericensis/Agropyron spicatum* (Arttrx/Agrspi) habitat type (Hironaka et al. 1983). Polygons with the ARTTRX cover are this habitat type unless noted otherwise in the polygon description. The *Artemisia tridentata* ssp. *xericensis/Festuca idahoensis* (Arttrx/Fesida) habitat type (Hironaka et al. 1983) is uncommon, found only along northerly slopes above Sage Creek in the eastern portion of the HMP Area. Areas where most or all of the xeric sagebrush and antelope bitterbrush has been killed by fire are mapped as one of the grassland cover types. The xeric sagebrush cover type encompasses the few antelope bitterbrush communities that occur within the HMP Area. These communities are related to the *Purshia tridentata/Agropyron spicatum* (Purtri/Agrspi) habitat type described by Hironaka et al. (1983). Patches of basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) occur along some terraced bottomlands that are also part of the xeric sagebrush cover type. These areas are likely related to the *Artemisia tridentata* ssp. *tridentata/Elymus cinereus* habitat type (Hironaka et al. 1983), but are so disturbed it is difficult to tell for sure. Additional general information concerning ssp. *xericensis* can be found in Rosentreter and Kelsey (1991) and Winward and Tisdale (1977). Xeric sagebrush vegetation was sampled at three sites, and the data summarized (Appendix 3).

Low sagebrush (*Artemisia arbuscula*: ARTARB) - This cover type is fairly widespread within the HMP Area, but only a few larger sites in the Fairchild Reservoir area are mapped separately. Low sagebrush communities are best developed on very clayey soils that are ephemerally saturated in the spring due to poor drainage properties. The high-clay soils tend to be have a light surface cover and in most cases can be distinguished on aerial photos. The larger low sagebrush communities are associated with drainage bottom areas, with small inclusions occurring in upland xeric sagebrush or scabland cover types. Low sagebrush clearly dominates this cover type, with coverage varying between 10% and 35% in most places. Low-growing antelope bitterbrush may be present in low density. Bluebunch wheatgrass is the most abundant graminoid in most late seral stands. In earlier seral communities it decreases significantly, while bulbous bluegrass and squirreltail increase. Associated forb cover is low, although diversity can be relatively high, including several species otherwise uncommon in the HMP Area. Bare ground coverage is usually at least 50%.

Most low sagebrush communities within the HMP Area are the *Artemisia arbuscula/Agropyron spicatum* (Artarb/Agrspi) habitat type (Hironaka et al. 1983). Two other low sagebrush habitat types described by Hironaka et al. (1983) occur in minor amounts, *Artemisia arbuscula/Poa secunda* (Artarb/Poasec) and *Artemisia arbuscula/Festuca idahoensis* (Artarb/Fesida). *Artemisia arbuscula/Poa secunda* occurs on sites with soils too shallow to support bluebunch wheatgrass, while *Artemisia arbuscula/Festuca idahoensis* is differentiated by the presence of Idaho fescue. Both are noted as inclusions in a couple of polygons. Low sagebrush vegetation was sampled at three sites, and the data summarized (Appendix 3).

Grassland cover types

The HMP Area is located in a region where the lowlands are dominated by sagebrush-steppe vegetation. As a result, climax grassland vegetation is relatively uncommon compared to the Hells Canyon area further north. Most polygons mapped as the xeric sagebrush cover type contain naturally open areas with widely scattered shrubs. For purposes of the vegetation map, these open, bunchgrass-dominated grassland areas are considered part of the xeric sagebrush cover type mosaic, and not mapped separately as grasslands.

Bluebunch wheatgrass (*Agropyron spicatum*: AGRSPI) - This cover type includes two types of vegetation: (1) climax grasslands that never supported shrubs and related to the canyon grassland vegetation typifying Hells Canyon to the north, and (2) grassland vegetation in burned sagebrush communities that are climax Arttrx/Agrspi. Grassland vegetation containing bluebunch wheatgrass characterizes this cover type in both cases. Climax grasslands are found on northeasterly and westerly slopes within the Buckwheat Flats RNA, east- and west-facing slopes above the Mann Creek road and in upper Sage and Keithly creeks, xeric slopes above Fir Creek, and the south-facing slope above lower Adams Creek. All of these areas are steep and rocky. The soils above the Mann Creek road are not derived from Columbia River Basalt rocks like the rest of the HMP Area, but from sedimentary and fine-grained volcaniclastic parent material (Mitchell and Bennett 1979). These grasslands are related to the *Agropyron spicatum-Poa secunda/Balsamorhiza sagittata* (Agrspi-Poasec/Balsag) habitat type described by Tisdale (1986). The Buckwheat Flats RNA area also supports a minor amount of the *Festuca idahoensis-Agropyron spicatum* (Fesida-Agrspi) habitat type (Tisdale 1986).

This cover type is more common in burned xeric sagebrush/bluebunch wheatgrass sites, where little or no shrub regeneration has taken place. Herbaceous composition is similar to the xeric sagebrush cover type. Bluebunch wheatgrass and native forbs dominate late seral herbaceous layers. Bulbous bluegrass and/or squirreltail may be co-dominants, or even dominate mid-seral conditions. Early seral grassland vegetation strongly dominated by bulbous bluegrass is mapped as the bulbous bluegrass cover type.

Bulbous bluegrass (*Poa bulbosa*: POABUL) - This is a very early or early seral condition cover type with the vegetation dominated by bulbous bluegrass. Annual brome species are usually common and bluebunch wheatgrass rare or confined to scattered clusters. Associated native forbs tend to be "increasers" such as hawksbeard (*Crepis* spp.), spurred lupine, and autumn willowweed (*Epilobium paniculatum*). Introduced weedy forbs include salsify (*Tragopogon dubius*) and thistles (*Cirsium* spp.). This cover type occurs in areas where the native bunchgrasses were likely depleted prior to fires that killed off the xeric sagebrush and antelope bitterbrush. In places, burned shrub skeletons or only the charred bases may remain. The habitat type for these sites is predominately *Artemisia tridentata* ssp. *xericensis/Agropyron spicatum*, but also includes *Artemisia arbuscula/Agropyron spicatum, Purshia tridentata/Agropyron spicatum* and *Agropyron spicatum-Poa secunda/Balsamorhiza sagittata* These early seral grasslands often occur in areas of gentle topography that were, and still may be used heavily by livestock.

Intermediate wheat (*Agropyron intermedium*: AGRINT) - This cover type applies to areas that have been successfully seeded to intermediate wheat monocultures. The native vegetation, including the shrubs are basically gone, although some regeneration may be occurring. It does not include areas where intermediate wheat has just been interseeded and components of the native vegetation persist. The vegetation is considered a very early seral version of the *Artemisia tridentata* ssp. *xericensis/Agropyron spicatum* habitat type. This cover type is confined to one polygon in the southeastern portion of the HMP Area, east of Deer

Creek.

Scabland cover types

Scabland refers to sites where soils are stony and very shallow to bedrock, and supporting a sparse, low-growing vegetation. Most sites are flat to gently sloping. Further west, in Oregon and Washington, a well developed cryptogamic crust is usually associated with scabland sites. This is not the case in Idaho, where crust development is minimal and bare ground/gravel-small pebble/rock coverage usually high. However, many of the rocks and larger pebbles jutting above the surface may be covered with lichens and to a lesser degree mosses. Scabland vegetation contains a characteristic low-shrub dominant, Sandberg's bluegrass as the main native bunchgrass, and a suite of distinctive low forbs, most of them absent in nearby deeper soil habitats. Daubenmire (1970) suggests that variation in the fracture network of the underlying basalt may be a key factor in determining the variation in scabland shrub dominants. Livestock may trail through, but probably do not spend much time foraging in the scablands. Seral pathways have not been well-studied for most scabland vegetation. Most communities within the HMP Area appear to be largely mid-seral, with bulbous bluegrass at least as common as Sandberg's bluegrass. Late seral examples contain relatively little bulbous bluegrass, while an early seral herbaceous layer has few native bunchgrasses. The scabland communities are relatively resistant to fire, and unburned inclusions are commonly surrounded by burned xeric sagebrush habitats.

For purposes of the vegetation map we recognize three scabland cover types. A fourth scabland community type, stiff sagebrush/Sandberg's bluegrass (*Artemisia rigida/Poa secunda*; Artrig/Poasec) occurs within the HMP Area, but stands are of insufficient size to warrant a separate cover type. It is restricted to a few inclusions in the eastern half of the HMP Area. The presence of stiff sagebrush instead of one of the low buckwheats characterizes this scabland community. Grass and forb associates appear to be similar to the other scabland types. Regional classifications by Daubenmire (1970), Hall (1973), Tisdale (1986), and Johnson and Simon (1987) describe stiff sagebrush communities. Minor amounts of the *Artemisia arbuscula/Poa secunda* habitat type occur within the HMP Area, but we are recognizing it as part of the sagebrush cover type series even though it shares several characteristics with scabland vegetation.

Rock buckwheat (*Eriogonum sphaerocephalum*; ERISPH) - Rock buckwheat is the dominant and in many cases the only low-growing shrub occurring in this cover type. Small amounts of *Eriogonum thymoides* and/or *E. umbellatum* may be interspersed, often in a segregated manner. A low, sprawling form of antelope bitterbrush occasionally occurs along the scabland fringes. Total shrub cover is under 20% in most if not all places. Sandberg's bluegrass is the primary native bunchgrass in late seral stands. The presence of this grass and the absence of bluebunch wheatgrass help define this cover type. Bulbous bluegrass is the main invasive grass and the dominant graminoid in at least portions of many polygons. Many examples of this cover type have more bulbous bluegrass than Sandberg's bluegrass, but otherwise look undisturbed. It appears likely that bulbous bluegrass will remain a part of these scabland communities indefinitely. Forb coverage is low, with *Lomatium* spp. (biscuitroots), *Allium* spp. (onions), *Microseris troximoides* (false-agoseris), and *Trifolium macrocephalum* (big-head clover) being common associates. The tandem of buckwheats and associated forbs can provide a colorful wildflower display in the spring.

This is the most common scabland cover type within the HMP Area. The other scabland communities occur as inclusions within this main type. This cover type is related to the *Eriogonum sphaerocephalum/Poa secunda* habitat type described by Daubenmire (1970), although it differs in several

ways - (1) the presence of bulbous bluegrass; (2) Sandberg's bluegrass coverage tends to be lower (even counting the cover of bulbous bluegrass); (3) somewhat lower associated forb diversity; and (4) the association of different species of *Lomatium*, and the absence of *Haplopappus stenophyllus*. We conducted ecological sampling at three locations, and the data have been summarized (Appendix 3) .

Thyme-leaved buckwheat (*Eriogonum thymoides*: ERITHY) - This is the most depauperate of the scabland cover types. Thyme-leaved buckwheat plants are well-spaced, occurring at less than 10% cover. Other buckwheats are rare or absent, with Sandberg's bluegrass being the main native bunchgrass. Bulbous bluegrass is the principle invasive grass, but it does not establish very well within this cover type. Grass cover is also usually less than 10%. Forbs may be abundant in number, but because individuals are small and fine-leaved, their cover is minimal. Large expressions of this cover type are rare, and more often it occurs as an inclusion within the rock buckwheat type. Because of this pattern, the vegetation map does not contain polygons with only the thyme-leaved buckwheat cover type.

This cover type differs from the *Eriogonum thymoides/Poa secunda* habitat type described by Daubenmire (1970) in similar ways as the rock buckwheat cover type. We sampled three sites and the data have been summarized (Appendix 3).

Gray's biscuitroot (*Lomatium grayi*: LOMGRA) - This scabland cover type is distinguished by the dominance of Gray's biscuitroot, with Sandberg's bluegrass being the main native bunchgrass. Buckwheats or other shrubs are rare or absent. Bluebunch wheatgrass and squirreltail are occasionally represented at low density. Bulbous bluegrass has invaded most sites to one degree or another. Associated forb diversity and abundance appears similar to the other scabland communities. This minor cover type is usually part of a larger rock buckwheat-dominated scabland complex, or an inclusion within the xeric sagebrush or grassland cover types. It has not been described in any regional classifications. We sampled one site within the Buckwheat Flats RNA and have summarized the data (Appendix 3). A variation of this cover type was observed on steep, very rocky, sparsely vegetated slopes that contained a profusion of hot-rock penstemon (*Penstemon deustus*) and scattered clumps of bluebunch wheatgrass.

Mountain shrub cover type

Mountain shrub communities are widespread within the HMP Area. They are best developed on steep easterly exposures, especially along upper slope and brow positions. Mountain shrubfields are common along northern aspects at the lower elevations, but tend to be replaced by Douglas-fir stands above approximately 3,600 feet in the Fir and Keithly creeks areas. Draws, slopes adjacent to riparian areas, topographic concavities, and ridgetops with deeper, better drained soils are other areas that often support mountain shrub vegetation. Many shrubfields are long and narrow in shape. Shrub cover is variable and can be discontinuous in places, but overall is usually at least 50%. Shrubfields characterized by a patchy shrub distribution are usually interspersed within a xeric sagebrush/bluebunch wheatgrass community matrix. Many shrubfields have burned in recent fires that have swept through parts of the HMP Area. In most places we observed good shrub regeneration. This is primarily an upland vegetation, but it occasionally occurs in riparian habitats.

Mountain shrub (MTSHRUB) - Vegetation dominated by a diverse list of deciduous shrub species distinguishes this cover type. Common shrubfield species include bittercherry, chokecherry, serviceberry (*Amelanchier alnifolia*), mallow ninebark, Wood's rose (*Rosa woodsii*), black hawthorne, antelope bitterbrush, Rocky Mountain maple (*Acer glabrum*), common snowberry (*Symphoricarpos albus*),

mountain snowberry (*Symphoricarpos oreophilus*), snowbrush ceanothus (*Ceanothus velutinus*), Oregon creeping grape (*Berberis repens*), and big sagebrush (apparently both *Artemisia tridentata* ssp. *vaseyana* and ssp. *xericensis*). Many shrubfields are dominated by one species, most commonly bittercherry. Less often chokecherry is the community dominant. In the Keithly Creek drainage, several shrubfields are dominated by mallow ninebark. Snowbrush ceanothus or antelope bitterbrush are the most abundant shrubs in a few situations. Polygon descriptions will note when a particular species is known to be the community dominant. There are also many mountain shrub communities where there is no clear dominant. The composition and ratio of shrub species comprising these mixed shrubfields is variable. Shrubfield structure ranges from a single uniform height, to more complex multiple layer communities. Thickets generated from many root sprouts is a distinguishing character of many bittercherry- and chokecherry-dominated communities.

Some mountain shrubfields at upper elevations within the HMP Area contain scattered individual or small clusters of Douglas-fir trees, while other areas that have recently burned contain snags and/or young regeneration. These seral shrubfield communities occur in the Keithly Creek, Fir Creek, and upper Sage Creek areas. Bittercherry is the most abundant shrub in nearly all cases. Steele and Geier-Hayes (1989) recognize bittercherry as one of the mid-seral shrub layer successions within the Douglas-fir/mallow ninebark habitat type. They also recognize snowbrush ceanothus and Scouler's willow (*Salix scouleriana*) layer groups for this habitat type, both of which appear to be present within the HMP Area.

The mountain shrub cover type includes talus-shrub garlands, which are inclusions of large to small talus streams ringed by a deciduous shrube. The garlands are positioned on steep slopes downslope from eroding cliffs or rock outcrops. Common garland species are syringa (*Philadelphus lewisii*), chokecherry, elderberry (*Sambucus cerulea*), and serviceberry. Talus-shrub garlands are not as common within the HMP Area as further north in Hells Canyon.

Montane mixed deciduous shrub communities are not described in any regional classification. Roberts (1971) investigated bittercherry on the Boise National Forest, but does not include a classification. Mancuso and Moseley (1995) provide some descriptive information for bittercherry communities in the Brownlee area. Mancuso (1995) briefly summarizes chokecherry communities for the Raft/Dennett creeks area north of the HMP Area. Management, successional, and vegetation information for a number of seral shrub community groups are discussed in Steele and Geier-Hayes (1989; 1993). Talus-shrub garland vegetation for the Hells Canyon area is described by Johnson and Simon (1987).

Forest cover types

The most extensive forest stands within the HMP Area are found on the slopes above Keithly Creek. Well developed stands also occur in the Fir Creek, and to a lesser degree upper Sage Creek drainages. Large blocks of conifer forest are abundant north of the HMP Area in the Hitt Mountains on the Payette National Forest. Douglas-fir is the primary conifer species throughout the HMP Area. Ponderosa pine (*Pinus ponderosa*) are scattered within some forest stands, and grand fir (*Abies grandis*) occurs locally along Keithly Creek.

Douglas-fir (*Pseudotsuga menziesii*; PSEMEN) - Open to closed stands of Douglas-fir readily distinguishes this cover type. Larger polygons usually contain both open and closed canopy areas. The understory is dominated by deciduous shrub species in most places. Shrub density is highest where the canopy is more open. Common snowberry and mallow ninebark are the most common forest shrubs, although

bittercherry, serviceberry, white spiraea (*Spiraea betulifolia*), and Rocky Mountain maple can also be common. A fringe of shrubs often extends beyond the forest margin and grades into the adjacent sagebrush-bitterbrush vegetation. Areas where shrubs are more or less absent support a pinegrass (*Calamagrostis rubescens*) understory. There are also a few forested areas where intensive livestock and probably wildlife use as well, has resulted in an understory of mostly bare ground and/or weedy annuals. This was observed in areas adjacent to stock reservoirs and gentle upper slopes, where a lot of trailing and bedding occurs. On the steep slopes above Keithly Creek, bands of grassland vegetation regularly interrupt the forest where the soils are rocky and shallow. These canyon grassland (*Agropyron spicatum-Poa secunda/Balsamorhiza sagittata* habitat type) inclusions are mapped as part of the forest vegetation.

Most forest polygons support the *Pseudotsuga menziesii/Symphoricarpos albus* (Psemen/Symalb) or *Pseudotsuga menziesii/Physocarpus malvaceus* (Psemen/Phymal) habitat types (Steele et al. 1981). The *Pseudotsuga menziesii/Calamagrostis rubescens* (Psemen/Calrub) habitat type (Steele et al. 1981) is less widespread. Terraces along Keithly Creek near the northern boundary of the HMP Area support small amounts of the *Abies grandis/Spiraea betulifolia* (Abigra/Spibet) habitat type (Steele et al. 1981). They note that in some places common snowberry replaces white spiraea as the understory species. This is the case along Keithly Creek. Several small, outlying forest polygons contain a mixed deciduous shrub understory usually dominated by bittercherry. These areas apparently support the *Pseudotsuga menziesii/Physocarpus malvaceus* habitat type. Stands that have recently burned in the Keithly Creek and upper Sage Creek drainages are presently dominated by mountain shrub species.

Riparian cover types

Riparian vegetation within the HMP Area occurs as a narrow band alongside perennial and ephemeral watercourses, and usually has a sharp ecotone differentiating the adjacent uplands. Most riparian stretches are shrub-dominated. There are a few wet meadow habitats dominated by species such as common spike-rush (*Eleocharis palustris*) or other graminoids. These are noted in the polygon descriptions, but no vegetation map cover types are described for riparian meadow vegetation.

Black hawthorne (*Crataegus douglasii*: CRADOU) - This riparian cover type is distinguished by the dominance of black hawthorne, which often forms a nearly impenetrable thicket. The black hawthorne usually averages 3-5 m tall, and multiple size (age?) classes were observed in most places. Some riparian sections can have abundant Geyer's willow (*Salix geyeriana*), or whiplash willow (*Salix lasiandra*). Other deciduous shrubs such as Wood's rose, chokecherry, serviceberry, golden currant (*Ribes aureum*), and common snowberry occur at low density. Along Deer Creek, red-osier dogwood (*Cornus stolonifera*) was the main associated shrub. The herbaceous layer seems to usually have higher graminoid than forb coverage, and invariably contains several introduced species such as Kentucky bluegrass (*Poa pratensis*). The heavy livestock use associated with these riparian areas has influenced their composition and structure. Riparian vegetation dominated by black hawthorne has been reported from throughout the Pacific Northwest. In all instances, it is reported to be rare or uncommon due to impacts of livestock grazing and agricultural activities (Grossman et al. 1994)

Marks and Marks (1987) noted their riparian (RIPA) cover type for the HMP Area corresponded to Daubenmire's (1970) *Crataegus douglasii/Heracleum lanatum* habitat type. Although they are similar in some regards, we feel neither of Daubenmire's (1970) *C. douglasii* habitat types (*Crataegus douglasii/Symphoricarpos albus* is the other one) are fully satisfactory. There are several other regional classifications that contain black hawthorne types. The *C. douglasii/Rosa woodsii* association outlined in

Grossman et al. (1994) appears to be similar in most regards. Mancuso and Moseley (1995) outline a black hawthorne cover type for their Brownlee study area. Crowe and Clausnitzer (1995) describe a disturbance-induced black hawthorne community type for the Wallowa Mountains that is similar except for the lack of willows. Kovalchik (1987) describes a black hawthorne riparian association for central Oregon, and Hansen et al. (1995) describe a grazing-induced *C. succulenta* (succulent hawthorne) community type for Montana that includes black hawthorne. Black hawthorne riparian communities within the HMP Area may also be disclimax, or disturbance induced, at least in some places. Many riparian segments dominated by black hawthorne contain sufficient water to support willow-dominated communities. The occurrence of scattered short stretches with a lot of willow may indicate a remnant rather than subordinate status. We sampled three black hawthorne communities within the HMP Area, and have summarized the data (Appendix 3).

Mountain alder (*Alnus incana*: ALNINC) - Keithly Creek and sections of Sage Creek support riparian vegetation dominated by a dense mountain alder overstory and diverse understory shrub layer that includes willow species (*Salix* spp.), syringa, Rocky Mountain maple, black hawthorne, Wood's rose, water birch (*Betula occidentalis*), common snowberry, red-osier dogwood, and golden currant. There may be intermittent gaps in the alder overstory, and for short stretches it may be replaced by water birch, willow species (e.g., *Salix rigida*), or black cottonwood (*Populus trichocarpa*). Douglas-fir is the most common conifer species sprinkled in these riparian areas, although ponderosa pine and grand fir (along Keithly Creek) can also occur.

Mountain alder/water birch and mountain alder/willow are two associations we observed within the HMP Area. The former appears related to Miller's (1976) *Alnus incana/Betula occidentalis* community type. This cover type occurs where there is permanent streamflow. We did not sample any mountain alder communities and it is difficult to correlate them to other classified communities. Kauffman et al. (1985), Kovalchik (1987), Evenden (1989), Padgett et al. (1989), Crowe and Clausnitzer (1995), Hansen et al. (1995), and Manning and Padgett (1995) all describe mountain alder community types that may be applicable to one degree or another, although none seem fully satisfactory for the HMP Area.

White alder (*Alnus rhombifolia*: ALNRHO) - This cover type is restricted to Mann Creek and confluent lower Adams Creek. It is characterized by a white alder overstory and a diverse multi-layer shrub understory. Common shrubs include red-osier dogwood, syringa, Wood's rose, black hawthorne, common snowberry, Rocky Mountain maple, and golden currant. Herbaceous cover is variable. Black cottonwood trees protrude above the white alder in some sections to form a discontinuous upper canopy, along with a mix of some dead and decadent trees. The white alder canopy is mostly closed, but varies to being open in some stretches. The width of the white alder riparian zone varies from less than 10m, to greater than 30m.

White alder communities dominate many tributaries of the lower Salmon, lower Clearwater, and Snake river canyons. Mann Creek approaches the southernmost extension of white alder in Idaho. The most comprehensive regional treatment of white alder is by Miller (1976). Huschle (1975) and Daubenmire (1970) also describe white alder types. Mancuso and Moseley (1995) include a white alder cover type for their Brownlee area vegetation map. Casual inspection suggest white alder along Mann and lower Adams creeks is related to Miller's (1976) *Alnus rhombifolia/Philadelphus lewisii* community type.

Organization of the vegetation map

The vegetation map consists of 154 polygons, numbered 1 to 154. The numbering sequence begins in the

southeastern portion of the HMP Area and scrolls to the north and west. Polygons 1-80 and 119-154 are located east of Mann Creek, while polygons 81-118 are to the west. Polygons 1-41 occur largely on the Midvale Hill quadrangle, polygon 42-118 largely on the Mann Creek NW quadrangle, polygons 119-141 largely on the Sturgill Peak quadrangle, and 142-154 largely on the Hopper Creek quadrangle. Riparian polygons are usually long and linear in shape. In several cases, these long polygons encompass more than one cover type. Adjacent upland polygon numbers are used to reference descriptive information for the riparian vegetation along a particular stream segment. The width of most riparian polygons exaggerates the actual width of the riparian vegetation. This was unavoidable for the sake of clarity.

The size of the HMP Area is approximately 27, 740 acres (Bureau of Land Management 1994). The GIS-generated vegetation map entails 27,317 acres. This discrepancy is partly due to the omission of Fairchild Reservoir and other smaller stock reservoirs in the calculations. Another likely contributing factor is the imprecise match of the actual HMP Area boundaries with the approximate boundaries delineated for the vegetation map.

Classification of the vegetation map is based on 13 cover types. Each polygon is assigned a primary cover type reflecting the dominant vegetation. The polygon descriptions also contain information regarding cover type inclusions, ecological condition, and other descriptive information. The vegetation of a particular area within the HMP Area can be determined by referencing the appropriate polygon description. It is necessary to have a copy of the vegetation map to determine which polygon covers a particular area.

The thyme-leaved buckwheat (ERITHY) and Gray's biscuitroot (LOMGRA) cover types occur only as inclusions. The intermediate wheat (AGRINT) and white alder (ALNRHO) cover types occur in only one polygon apiece. Polygons with the xeric sagebrush (ARTTRX) and rock buckwheat (ERISPH) cover types are the most common and cover the greatest area. The mountain shrub (MTSHRUB) cover type is the most common inclusion. Polygons range in size from 1,879 acres (polygon #6) to about 8 acres (polygon #57). Mean polygon size is approximately 177 acres. Table 3 summarizes the frequency of each cover type, while Table 4 summarizes the extent and average polygon size for each cover type. Because they occur only or mainly as inclusions, acreages for the ARTARB, ERITHY, and LOMGRA cover types are not accurately reflected in the vegetation map. Appendix 2 lists the cover type, size (acreage), inclusions, and ecological condition assessment for each polygon.

Ecological condition assessment

Seral status is a key factor in appraising wildlife habitat (Thomas 1979). One of our objectives for the vegetation map was to provide an ecological assessment of selected habitats within the HMP Area. Our approach was to assign ecological ranks on an individual polygon basis. Because not all cover types are conducive to ready ecological assessment we limited our assessments to polygons dominated by sagebrush, grassland, and scabland cover types. The assignments represent our best judgement based on rapid ocular survey methods. No quantitative sampling was done. The majority of polygons are comprised of vegetation supporting a mix of seral conditions. Ecological rank assignments reflect the overall and predominant status of the polygon's vegetation. For some polygons this is best expressed as a range of ecological ranks. The ecological ranks are based on sequential stages of retrogression from the sites natural potential vegetation (climax). The natural potential vegetation equates to the habitat type for a given site. The ecological ranks are slightly modified from Johnson and Simon (1987) and defined as follows:

Climax - the stable state when species composition and density do not change appreciably over time and

Table 3. Cover type frequencies for the HMP Area vegetation map.

	Frequency	
	Primary cover type (%)	[1]Cover type as an inclusion
ARTTRX	42 (27)	29
ARTARB	2 (1)	9
AGRSPI	15 (10)	6
POABUL	7 (5)	1
AGRINT	1 (<1)	0
ERISPH	29 (19)	15
ERITHY	0 (0)	14
LOMGRA	0 (0)	9
MTSHRUB	23 (15)	45
PSEMEN	18 (12)	9
CRADOU	13 (8)	4
ALNINC	3 (2)	1
ALNRHO	1 (<1)	0
Total	154 (100)	142

[1]Inclusions for the MTSHRUB and CRADOU cover types are depicted on the vegetation map.

dominant species are reproducing.

Late seral - Climax species are present, but not at climax density and composition levels. Exotic species are present in only small amounts. Mid seral - The major climax species are present, but at reduced density and composition. Associated species sensitive to disturbance have a reduced abundance or may be missing, while species tending to increase with disturbance often occur in skewed abundance. Invading species are usually common.

Early seral - Major climax species are present, but in peril of being lost from the community. Native species that tend to increase with disturbance may be common. Invading species are abundant and usually dominate the vegetation. A disclimax will likely result if degradation continues.

Very early seral - Climax species are absent or so few as to make natural recolonization highly unlikely. Invading species strongly dominate the vegetation. A disclimax exists, and generally only manipulative change can reintroduce native dominants, at least in the short term.

Disturbances throughout the HMP Area limit any climax stage vegetation to small, fragmented areas. Livestock grazing and associated activities such as roads, stockponds, fencing, and vegetation treatment are the most widespread disturbances within the HMP Area. The construction of Fairchild Reservoir was a major local disturbance. Wildfires have had a large effect on vegetation patterns within the HMP Area. Disturbances caused by wildlife are also evident in places. The Hixon Preserve Field is a large fenced area in the southeastern quarter of the HMP Area that is no longer grazed by livestock. Most late seral

Table 4. Total and relative extent, and average polygon size for the vegetation map cover types.

	[1]Aerial extent (acres)	Relative extent (%)	Avg. polygon size (acres)
ARTTRX	9,162	34	213
ARTARB	194	<1	97
AGRSPI	4,761	17	317
POABUL	1,890	7	270
AGRINT	123	<1	123
ERISPH	6,449	24	179
ERITHY	-	-	-
LOMGRA	-	-	-
MTSHRUB	2,431	9	97
PSEMEN	1,167	4	58
CRADOU	614	2	41
ALNINC	403	1	100
ALNRHO	122	<1	122
TOTAL	27,317	100	177

[1]Acreages are approximate because additions and subtractions of aerial extent due to inclusions are not taken into account. The relative extent calculation is also approximate because it too is based on the primary cover type for each polygon, and therefore, does not take into account inclusions. Because no polygons list them as the primary cover type (only inclusions), there are no values for ERITHY or LOMGRA.

condition sagebrush-steppe habitat east of Mann Creek is found within this area.

Within the HMP Area, bulbous bluegrass is the most common invasive grass, followed by the annual bromes, such as cheatgrass *(Bromus tectorum)*. Very early or early seral condition vegetation is implicit for polygons containing the bulbous bluegrass cover type. Even late seral communities usually contain small amounts of these exotic species. Native forb species that tend to increase with livestock grazing disturbance include yarrow, hawksbeard, spurred lupine, and autumn willowweed. Salsify, thistles, and tumble mustard (*Sisymbrium altissimum*) are exotic forbs commonly present in disturbed areas.

Different seral stages may apply for the different life-form layers within a community (Hall et al. 1995). Within the HMP Area, this most commonly applies to areas with the xeric sagebrush/bluebunch wheatgrass habitat type. Sagebrush communities that burned and show no shrub regeneration are considered to have an early seral shrub layer. The associated herb layer may be late seral, however, if it is dominated by bluebunch wheatgrass and other native species. Other permutations are also possible. Seral status information is contained in the polygon descriptions.

Polygon descriptions

Because of their importance as sharp-tailed grouse habitat, the location of mountain shrub (MTSHRUB) and black hawthorne (CRADOU) inclusions are included on the vegetation map. Forty-five polygons contain mountain shrub inclusions, and four contain black hawthorne inclusions large enough to be depicted on the vegetation map. In many cases there are more than one inclusion per polygon. Mountain shrub and black hawthorne inclusions are referenced in bold type in the following polygons description.

1. ARTTRX cover type - mix of early and mid-seral conditions; a few scattered deciduous shrubs. There is a small patch of mature black cottonwood trees associated with a spring and old line shack.

2. ARTTRX cover type - mostly early seral in western, and mid-seral condition in eastern half of polygon; antelope bitterbrush is sparse in places, but well represented along ridges and upper slopes. There is an inclusion of late seral Artrtx/Fesida h.t. (with little sagebrush, but high antelope bitterbrush coverage, so perhaps Purtri/Fesida h.t.) on a steep north-facing slope in the northeastern part of the polygon. Site for plots 96MM003 and 004.

3. CRADOU cover type - large and decadent willow shrubs (*Salix geyeriana* and *S. lasiandra*) are abundant in stretches; riparian channel supports a band of wet meadow vegetation downstream from the polygon.

4. ERISPH cover type - bulbous bluegrass is most abundant associated grass; small inclusions of ERITHY.

5. AGRINT cover type - scattered individual or small patches of xeric and low sagebrush, as well as antelope bitterbrush along ridgecrest.

6. ARTTRX cover type - mix of early and mid-seral understory; few tall deciduous shrubs; only scattered small inclusions of ERISPH or open rocky areas; at least one ARTARB inclusion. Squawapple (006, part of 007) occurs within the polygon. The channel leading downstream from Fairchild Reservoir supports a strip of wet meadow vegetation with common spike-rush.

7. CRADOU cover type - a mix of deciduous shrub species associated with the black hawthorne; small wet meadows in adjacent bottomlands; site for plot 96MM001.

8. ERISPH cover type - mix of late and mid-seral condition; small deciduous shrub patch at north end of polygon; site of plot 96MM002.

9. POABUL cover type - Arttrx/Agrspi h. t. that has burned and is now largely a bulbous bluegrass-dominated grassland; squirreltail is common in many places, while bluebunch wheatgrass is sparse except for a few scattered inclusions where it is more common; a few ARTTRX, ARTARB, and small MTSHRUB inclusions. There is evidence of mechanical ripping over large areas associated with the BLM's sagebrush reseeding project. No sagebrush seedlings were observed during the spring, 1996.

10. ARTTRX cover type - Artrtx/Fesida habitat type probably in late seral condition.

11. CRADOU cover type - there is a small clump of black cottonwoods, a small wet meadow, and a

patch of cattails (*Typha latifolia*) at head of spring.

12. ARTTRX cover type - mostly mid-seral, grading into early seral grassland vegetation similar to polygon #9 along its western edge.

13. ARTTRX cover type - Arttrx/Fesida h. t. probably in late seral condition.

14. ERISPH cover type - mid-seral with a few late seral portions; inclusions of ARTTRX on scattered mounds of deeper soil.

15. AGRSPI cover type - late seral condition; lots of rock rubble and talus streams with abundant hot rock penstemon *(Penstemon deustus)* on steep west-facing slope. The steep north-facing slope above Sage Creek supports Fesida/Agrspi h.t. and talus-shrub garlands. Located within the Buckwheat Flats RNA.

16. ERISPH cover type - with ARTTRX, and small inclusions of ERITHY and LOMGRA; mix of early and mid-seral conditions with bulbous bluegrass common throughout the flats. Located within the Buckwheat Flats RNA and site of plot 96MM010.

17. Sage Creek - ALNINC cover type in vicinity of polygon # 22, with *Salix* spp. and inclusions of CRADOU in the vicinity of polygons # 9 and 10. CRADOU cover type in vicinity of polygons # 71 and 78; with black cottonwood occurring in places, as does a dense tall shrub mix on the slopes adjacent to the creek. Upper Sage Creek in the vicinity of polygons # 133 and 75 is mostly PSEMEN cover type, with mixed deciduous shrub. This combination intrudes into polygon # 133 as depicted on the vegetation map.

18. POABUL cover type - bluebunch wheatgrass co-occurs on east-facing slopes; ARTTRX is scattered along toeslope and western one-third of polygon; inclusions of MTSHRUB consisting of stunted chokecherry clones on slopes, and mixed species in draw.

19. MTSHRUB cover type - shrubfields dominated by chokecherry intermixed within sagebrush vegetation that has burned. The deciduous shrubs have resprouted (some mortality), but most of sagebrush and antelope bitterbrush were killed. Bluebunch wheatgrass is prominent in openings.

20. AGRSPI cover type - burned (early seral) Arttrx/Agrspi h.t. with few remnant shrubs and lots of bulbous bluegrass; herbaceous layer varies from early to late seral; several large ERISPH inclusions.

21. AGRSPI cover type - burned (early seral) Arttrx/Agrspi h.t. with few shrubs remaining; bulbous bluegrass is common in places, and the herbaceous layer ranges from early and late seral.

22. AGRSPI cover type - burned (early seral) Arttrx/Agrspi h.t. with all the sagebrush killed; bulbous bluegrass common, and Idaho feacue present on northerly inclusions.

23. ERISPH cover type - with inclusions of ERITHY and LOMGRA.

24. AGRSPI cover type - Arttrx/Agrspi h.t. that has mostly burned; there is little remnant sagebrush (early seral), and the herbaceous layer is mostly mid-seral. There are inclusions of MTSHRUB on east-facing slopes, CRADOU stringers along drainage bottom, and limited ERISPH. Idaho fescue occurs on some northerly exposures.

25. ARTTRX cover type - with lots of antelope bitterbrush, and inclusions of MTSHRUB dominated by chokecherry.

26. ERISPH cover type - with ERITHY in places; patches of ARTTRX are heavily grazed and degraded, and some areas interseeded with intermediate wheatgrass; MTSHRUB inclusions.

27. ARTTRX cover type - early seral understory; with MTSHRUB inclusions.

28. ARTTRX cover type - early seral understory with little bluebunch wheatgrass remaining. MTSHRUB inclusions found in small draws and brow positions.

29. ERISPH cover type - inclusions of ARTTRX intermixed with MTSHRUB on northerly exposures and in draws, and ARTTRX with early seral understory on south-facing slopes.

30. ERISPH cover type - with ERITHY and AGRSPI inclusions.

31. CRADOU cover type.

32. CRADOU cover type.

33. AGRSPI cover type - burned Arttrx/Agrspi h.t. with few shrubs remaining; bulbous bluegrass is common in places; early seral, with a mostly mid-seral understory.

34. ERISPH cover type - with large inclusions of ERITHY along ridgecrest; inclusions of ARTTRX and AGRSPI, both of which are grazed by livestock.

35. AGRSPI cover type - burned (early seral) Arttrx/Agrspi h.t. with only a few shrubs remaining; understory is mostly mid-seral, with bulbous bluegrass being common in places. There is a patch of leafy spurge (*Euphorbia esula*) in the polygon.

36. ERISPH cover type - majority of area has burned; ERISPH is the most common scabland type in a mosaic that includes burned and unburned Arttrx/Agrspi, and Agrspi-Poasec/Balsag h.t's. Unburned sagebrush vegetation supports an early to mid-seral understory, while bulbous bluegrass dominates the burned areas. Nearly all of the native grassland vegetation has burned and is early seral stage dominated by bulbous bluegrass, although Sandberg's bluegrass is common in places. MTSHRUB inclusions have resprouted in most places. Some burned areas may have been the Purtri/Agrspi h.t. Plot 96MM014 is located within the polygon.

37. "East Fork" Sage Creek - ALNINC cover type in vicinity of polygons # 33 and 35, with *Salix* spp. being a common associate, and interspersed with CRADOU and scattered Douglas-fir trees. CRADOU further upstream in the vicinity of polygon # 36 and site of Plot 96MM013. The upper end of the drainage in the vicinity of polygon # 146 supports CRADOU. There are inclusions of PSEMEN located near the plot, as well as MTSHRUB in small draws and slopes adjacent to the channel.

38. MTSHRUB cover type.

39. CRADOU cover type - Dry Creek; there are intermittent gaps in shrub coverage along the riparian

corridor.

40. MTSHRUB cover type - within mosaic of ARTTRX and ERISPH.

41. ARTTRX cover type - mostly mid-seral; inclusions of MTSHRUB in draws and steep lee of ridgecrests that are heavily grazed; bittercherry and chokecherry abundant in places. There are also inclusion of CRADOU in riparian areas, and small areas with stiff sagebrush. Portions of polygon between Dry and Keithly creeks near the eastern boundary of the HMP Area have burned, and considerable sagebrush and bitterbrush regeneration was observed.

42. CRADOU cover type - Deer Creek; red-osier dogwood is a prominent associate.

43. ERISPH cover type - a few inclusions of ARTTRX.

44. POABUL cover type - burned flats that probably supported low sagebrush and xeric sagebrush habitat types.

45. ERISPH cover type - with late seral condition ERITHY community at north end of polygon.

46. ERISPH cover type - early to mid-seral; with inclusions of ARTTRX and MTSHRUB.

47. AGRSPI cover type - burned (early seral) Artrx/Agrspi h.t.; the tall deciduous shrubs have resprouted nicely, but the sagebrush and bitterbrush are gone; MTSHRUB inclusions are common.

48. ARTARB cover type - extensive clay soils area; herbaceous layer is mostly mid-seral, but also early seral; squirreltail is more common than bluebunch wheatgrass in places; patches of mixed MTSHRUB. Plot 96MM009 is located in this polygon. The channel leading downstream from Fairchild Reservoir supports a strip of wet meadow vegetation with common spike-rush. There are no tall shrubs along the channel.

49. ERISPH cover type - scablands vegetation is more common along western half of polygon, while ARTARB dominates the eastern half. There are small inclusions of MTSHRUB along lee of knolls and small patches of ARTTRX associated with tops of knolls. Squawapple (portion of 007) occurs within the polygon.

50. MTSHRUB cover type - mixed shrub species with lots of snowbrush ceanothus and bluebunch wheatgrass common in the openings. Bittercherry dominates the point ridge in the southern part of the polygon. Squawapple (005) occurs within the polygon.

51. ARTTRX cover type - the more gentle upper slopes are mostly late seral condition with lots of antelope bitterbrush, a few widely scattered western juniper (*Juniperis occidentalis*) trees and frequent MTSHRUB inclusions that are dominated by bittercherry in most cases. Large portions of the steep mid- to lower slopes support Agrspi-Poasec/Balsag h.t., with high rock cover and inclusions of talus-shrub garlands.

52. ARTTRX cover type - mostly mid-seral; a few low density patches of MTSHRUB; patches of scotch thistle occur around reservoir; location of plot 96MM007.

53. ERISPH cover type - ERITHY common; mostly late seral condition; location of plot 96MM008.

54. MTSHRUB cover type - within an ARTTRX matrix.

55. POABUL cover type - burned Artrtx/Agrspi h.t. with scattered small inclusions of ARTARB and ERISPH that did not burn; bluebunch wheatgrass is rare in flats, but more common on gentle slopes. Corral is located in northern section of polygon.

56. MTSHRUB cover type - within an ARTTRX matrix.

57. CRADOU cover type - location for plot 96MM016.

58. ARTTRX cover type - mix of burned and unburned sagebrush habitat; inclusions of ERISPH and MTSHRUB.

59. ARTTRX cover type - with extensive MTSHRUB inclusions, and one of PSEMEN with deciduous shrubs at northern end of polygon; also inclusion of Artarb/Fesida h.t.

60. ERISPH cover type - late to mid-seral condition; minor amounts of ERITHY.

61. MTSHRUB cover type - patches of shrubs within a sagebrush matrix; approximately equal amounts of shrubfields and sagebrush; ditch bisects polygon.

62. ARTARB cover type - late to mid-seral condition; location of plots 96MM005 and 96MM006.

63. ARTTRX cover type - diverse vegetation with frequent inclusions of MTSHRUB that are typically dominated by bittercherry, and patches of PSEMEN. Inclusions of ARTARB (Artarb/Poasec and Artarb/Agrspi h.t's.)

64. PSEMEN cover type - southern half of polygon supports Douglas-fir with a tall shrub understory dominated by bittercherry, with Rocky Mountain maple, and aspen (*Populus tremuloides*); also portions with mostly common snowberry. Northern half of polygon is dominated by deciduous shrub vegetation, mostly bittercherry.

65. AGRSPI cover type - majority of slope supports grassland vegetation, including places in late seral condition. Sagebrush is absent or sparse except along more gentle upper slopes. Antelope bitterbrush occurs more consistently, but at low density. There are inclusions of PSEMEN, small deciduous shrub patches, and talus-shrub garlands, as well as rock outcrops and talus streams. The upper ridgecrest contains late seral scablands dominated by ERISPH, with small amounts of ERITHY and Artrig/Poasec.

66. ERISPH cover type - scabland-dominated vegetation in a mosaic with ARTTRX with inclusions of ERITHY and ARTARB.

67. ERISPH cover type - commonly in a mosaic with ARTTRX; inclusions of MTSHRUB in draws and easterly slopes, and also ARTARB (Artarb/Poasec h.t.).

68. MTSHRUB cover type - within a mosaic of ARTTRX; chokecherry is abundant; small inclusions of

ERISPH.

69. ERISPH cover type - inclusions of ARTTRX varying from late to early seral condition, and strips of MTSHRUB.

70. ARTTRX cover type - mostly unburned, with early and mid-seral areas; inclusions of ERISPH and MTSHRUB.

71. ARTTRX cover type - burned and unburned, with high sagebrush and antelope bitterbrush mortality in the burned portions; early and mid-seral herbaceous vegetation in burned areas; MTSHRUB has resprouted well with lots of chokecherry.

72. ERISPH cover type - with inclusions of ERITHY, and AGRSPI in spots where sagebrush burned.

73. CRADOU cover type - greater shrub density, including some Douglas-fir trees in upstream portion of polygon.

74. POABUL cover type - southern, more gently sloping portions of polygon support a mix of POABUL, ERISPH and ARTTRX. The steep east-facing slopes in northern half of polygon are dominated by POABUL with scabland inclusions and a few MTSHRUB stands. Uncertain how much of polygon burned.

75. AGRSPI cover type - steep, open slopes with rocky and/or scabland inclusions; ERISPH occurs on broad spur ridge faces; ARTTRX on slopes above draws with MTSHRUB in the draw bottoms. Bulbous bluegrass is abundant in places, and vegetation is in early to mid-seral condition.

76. "West Fork" Sage Creek - CRADOU cover type in vicinity of polygons # 58 and 59. The hydrology of this area has been altered by a transbasin ditch to Fairchild Reservoir. Further upstream in the vicinity of polygon # 120, the riparian vegetation is comprised of dense tall shrubs. We are unsure if black hawthorne dominates this stretch. Scattered Douglas-fir trees are also present.

77. "Middle Fork" Sage Creek - CRADOU cover type in vicinity of polygon # 68, with inclusions of ALNINC. Associated species include black cottonwood, Rocky Mountain maple, and peach-leaved willow (*Salix amygdaloides*).

78. ARTTRX cover type - the sagebrush is sparse in places; inclusions of ERISPH, especially near the Forest Service boundary; MTSHRUB dominated by chokecherry in places, and PSEMEN in upper end of polygon.

79. MTSHRUB cover type - gentle valley with many seeps and springs, with abundant chokecherry, and CRADOU patches associated with several of the seeps; ARTARB inclusions in clayey areas along bottoms.

80. ALNRHO cover type - Mann Creek riparian zone.

81. AGRSPI cover type - sparser vegetation and more rock on southerly aspects; some sagebrush and antelope bitterbrush; inclusion of PSEMEN near Mann Creek. Mostly mid-seral, but with areas in late seral condition.

82. ARTTRX cover type - mostly late and mid-seral; mosaic vegetation that also includes ERISPH and MTSHRUB.

83. PSEMEN cover type - Psemen/Phymal h.t.; shrubby canopy openings dominated by bittercherry; small inclusions of *Arttrx/Festida* h.t.

84. MTSHRUB cover type - with scattered small clumps and individuals of Douglas-fir; ARTTRX inclusions in open areas.

85. AGRSPI cover type - mostly late and mid-seral; antelope bitterbrush (many of them dead) widely scattered across the slope; a little sagebrush in places; rock outcrops and talus streams common; inclusions of talus-shrub garlands.

86. AGRSPI cover type - steep grassland slopes in late to mid-seral condition; inclusions of ARTTRX along moderate more stable upper slopes ; deciduous shrub strip along lower slopes adjacent to Mann Creek.

87. ARTTRX cover type - mid- to late seral; with open areas supporting Agrspi-Poasec/Balsag h.t., plus scattered deciduous shrubs.

88. PSEMEN cover type - Psemen/Symalb and Psemen/Phymal h.t's; the western one-third of the polygon has a more open, spotty canopy with larger shrubfields.

89. ARTTRX cover type - largely mid-seral; in a mosaic with lots of scabland vegetation dominated by LOMGRA. Fence along ridge is in disrepair.

90. ARTTRX cover type - a mosaic with MTSHRUB dominated by bittercherry; mostly mid-seral.

91. PSEMEN cover type - Psemen/Phymal the dominant habitat type; with interspersed shrubfield and sagebrush vegetation.

92. ARTTRX cover type - mostly late seral, with some areas mid-seral; MTSHRUB inclusions (with scattered Douglas-fir) are common and comprise about 35% of the polygon; minor ERISPH inclusions.

93. ARTTRX cover type - with some deciduous shrubs near Fir Creek; mostly mid-seral.

94. PSEMEN cover type - Psemen/Symalb and perhaps some Psemen/Calrub habitat types; there are some large trees within this polygon. The Fir Creek riparian zone contains Douglas-fir, with gaps dominated by black hawthorne.

95. ARTTRX cover type - mid-seral; with more antelope bitterbrush than sagebrush.

96. ARTTRX cover type - in a mosaic pattern with MTSHRUB patches usually dominated by bittercherry, scabland vegetation, and minor amounts of ARTARB that are associated with the rocky channels of ephemeral creek bottoms near the western edge of HMP area. A mix of early and mid-seral herbaceous layer.

97. ERISPH cover type - in a mosaic with rocky AGRSPI; varies from late seral to early seral in vicinity of stock pond.

98. PSEMEN cover type - Psemen/Symalb habitat type; the western 30% of polygon contains scattered Douglas-fir intermixed with large patches of MTSHRUB.

99. AGRSPI cover type - mostly mid-seral; with LOMGRA in some of the many rocky inclusions; ARTTRX along the more stable upper slope positions; small draws dissecting slope with stringers of mixed species MTSHRUB.

100. PSEMEN cover type - Psemen/Phymal habitat type.

101. MTSHRUB cover type - largely talus-shrub garlands, with inclusions of AGRSPI in open areas.

102. MTSHRUB cover type - multi-layered shrubfields generally dominated by bittercherry, with some intermixed Douglas-fir.

103. ARTTRX cover type - mid-seral; more antelope bitterbrush than sagebrush.

104. POABUL cover type.

105. ARTTRX cover type - a range of seral stages; several MTSHRUB inclusions, and small scabland openings.

106. PSEMEN cover type - twin polygons with Douglas-fir and a mixed deciduous shrub understory.

107. ERISPH cover type - patterned ground topography with inclusions of ERITHY and small patches of ARTTRX.

108. MTSHRUB cover type - with nearly equal amounts of ARTTRX in southern part of polygon that is mostly mid-seral, but varies from early to late; the shrub patches are dominated by *Prunus* spp. and vary from dense to open; a few small ERISPH inclusions.

109. PSEMEN cover type - open canopy with dense deciduous shrub layer with lots of bittercherry.

110. PSEMEN cover type - open canopy with deciduous shrub understory.

111. ARTTRX cover type - with a well developed sagebrush and antelope bitterbrush layer; inclusions of MTSHRUB. Herbaceous layer varies from early to mid-seral areas.

112. ARTTRX cover type - late and mid-seral except near stock reservoirs; MTSHRUB inclusions are common and usually dominated by bittercherry; shrubfields in draws may also contain black hawthorne, aspen, or occasionally Douglas-fir; several scabland inclusions.

113. CRADOU cover type - aspen/black hawthorne patches occur in polygon; there is also a narrow wet meadow complex alongside the creek.

114. ARTTRX cover type - gently undulating topography; occurring on slightly raised areas as a mosaic with ARTARB in the intervening poorly drained swales; bulbous bluegrass dominates the early seral herbaceous layer in both sagebrush types.

115. ARTTRX cover type - mosaic vegetation with many MTSHRUB inclusions; bulbous bluegrass is the predominant grass in flatter areas, while bluebunch wheatgrass is common on the slopes; mid-seral condition overall; scabland inclusions.

116. PSEMEN cover type - with mixed deciduous shrub understory; fire scars blacken the bases of most of the conifers.

117. MTSHRUB cover type - includes areas with scattered shrubs interspersed within a mid-seral bluebunch wheatgrass matrix; antelope bitterbrush is the most common shrub in places; Idaho fescue present on north-facing slope.

118. ARTTRX cover type - mid-seral; with scattered serviceberry shrubs, and grading into POABUL near southern boundary of the HMP Area; rock outcrop/cliff inclusion.

119. MTSHRUB cover type - bittercherry is most common shrub; intermixed with patches of ARTTRX, and small PSEMEN inclusions.

120. ERISPH cover type - MTSHRUB inclusions; also with small inclusions of ERITHY and ARTTRX.

121. PSEMEN cover type - with aspen and mixed deciduous shrubs.

122. ERISPH cover type - mid-seral.

123. PSEMEN cover type - Psemen/Symalb habitat type; in eastern section of polygon, small forest stands occur in a mosaic with shrubfield and sagebrush habitats; inclusions of ARTTRX.

124. ERISPH cover type.

125. MTSHRUB cover type - with scattered PSEMEN and small amounts of ARTTRX.

126. PSEMEN cover type - Psemen/Symalb habitat type; with some ponderosa pine in the stand.

127. ARTTRX cover type - with inclusions of ERISPH and MTSHRUB.

128. ERISPH cover type - with small inclusions of MTSHRUB, and AGRSPI on steeper slopes.

129. MTSHRUB cover type.

130. MTSHRUB cover type - with scattered individual and patches of Douglas-fir; Scouler's willow (*Salix scouleri*) is common in upper end of polygon.

131. CRADOU cover type - some Douglas-fir in places.

132. ERISPH cover type.

133. ARTTRX cover type - with common inclusions of MTSHRUB; widely scattered Douglas-fir, especially on slopes above and in draws; a few small ERISPH inclusions.

134. MTSHRUB cover type - with scattered Douglas-fir.

135. PSEMEN cover type.

136. ARTTRX cover type - this area is probably dominated by the Artrx/Agrspi h.t. However, we did not visit this area and are uncertain how much, if any burned, and present vegetation patterns. The polygon may be a mosaic of unburned sagebrush-antelope bitterbrush and bluebunch wheatgrass- and/or bulbous bluegrass-dominated areas.

137. ARTTRX cover type - with extensive MTSHRUB inclusions, especially along upper slopes and in draws; late and mid-seral areas.

138. MTSHRUB cover type - bittercherry and chokecherry dominate the upper slopes, but nearly pure stands of mallow ninebark occur along some mid- and lower-slope positions. Blackened snags scattered throughout the polygon indicate past fire, although several clumps of Douglas-fir survived the burn. ARTTRX, but with much more antelope bitterbrush than sagebrush, occurs across lower slopes.

139. PSEMEN cover type - mostly the Psemen/Symalb habitat type; mixed deciduous shrubfields occur in openings.

140. POABUL cover type - mosaic of open grassland vegetation that includes areas of mid-seral AGRSPI, scabland vegetation dominated by LOMGRA with minor amounts of Artrig/Poasec h.t., and MTSHRUB in draws. Most of antelope bitterbrush has ben killed by fire and appears to have been much more common than sagebrush (perhaps a bitterbrush and not sagebrush habitat type?).

141. PSEMEN cover type - Psemen/Phymal habitat type across most of slope, with sections of Psemen/Symalb. There are a few small scattered burned area. Small patches of Abigra/Spibet occur along upper Keithly Creek near the north end of HMP Area. Forest vegetation is regularly interrupted with open areas supporting AGRSPI grasslands. Deciduous shrubfields often dominated by mallow ninebark are locally associated with many forest margin and open areas.

142. ERISPH cover type - with inclusions of LOMGRA, and Artrig/Poasec h.t.

143. AGRSPI cover type - early and mid-seral; bulbous bluegrass is common, including as part of the LOMGRA inclusions; a few shrubfield inclusions in small draws.

144. MTSHRUB cover type - shrubs are most dense in small draws and along steep upper to mid-slopes. This area has burned, with snags still standing in places, but scattered individual and small patches of Douglas-fir remain. There is an inclusion of PSEMEN with aspen and dense bittercherry in the understory. The southern half of polygon is largely ARTTRX with deciduous shrub inclusions.

145. PSEMEN cover type - riparian area containing Douglas-fir with mixed deciduous shrubs; the

Douglas-fir is sparse in segments, where get inclusions of CRADOU.

146. ERISPH cover type - LOMGRA is also common in this mosaic with ARTTRX; bulbous bluegrass is abundant and sagebrush habitats are mostly early seral. Location for plot 96MM015.

147. MTSHRUB cover type - dominated by bittercherry with some Douglas-fir intermixed; inclusion of PSEMEN with disturbed understory adjacent to stock reservoir.

148. MTSHRUB cover type - some aspen mixed in.

149. PSEMEN cover type - mostly Psemen/Phymal habitat type; some burned snags along top margin of stand.

150. ARTTRX cover type - mix of burned and unburned vegetation, nearly all in early seral condition; inclusions of ERISPH, including large example around Point 4367, at southern end of polygon.

151. MTSHRUB cover type - within sagebrush matrix.

152. ARTTRX cover type - a mosaic of sagebrush stands largely degraded and with an early seral understory (some mid-seral portions), scabland vegetation consisting mainly of LOMGRA, and frequent MTSHRUB in draws and adjacent sideslopes. The shrubfields vary from mixed species, to being dominated by bittercherry or mallow ninebark.

153. MTSHRUB cover type - in a mosaic with ARTTRX that supports a mostly early seral understory. Shrubfields are mostly dominated by bittercherry, although some patches dominated by mallow ninebark or mixed species. Part of polygon has burned in the past and apparently supported stands of Douglas-fir.

154. ALNINC cover type - Keithly Creek riparian zone. Upstream from where Forest Service road drops down to Keithly Creek the riparian vegetation is dominated by mountain alder, with water birch common in stretches. For the most part, black cottonwood occurs as scattered individuals or small clumps, but is more common over few short areas. The riparian vegetation was not surveyed downstream from the Forest Service road, but is likely the same.

Vegetation sampling

Several plant communities within the HMP Area have not been quantitatively sampled and classified, or have received only minimal investigation. The relationship between communities located in west-central Idaho and other regional classifications is often unclear due to the paucity of ecological sampling of non-forest habitats in the area. We conducted a limited amount of ecological sampling to quantify selected community types. This information was useful for comparisons to existing classifications, to write the cover type descriptions for the vegetation map, and to document undescribed types. A total of 16 plots were sampled in six community types (Table 5). Each community type was sampled at three sites except for *Lomatium grayi/Poa secunda*, which was sampled at only one site. Plots are referenced using a unique alpha-numeric code (plot code) and numbered 96MM001 to 96MM016. Plot locations are mapped (Appendix 4), and species cover and constancy information summarized for each community (Appendix 3).

Table 5. Plant community types sampled in the HMP Area.

Community type	Plot code numbers
Artemisia tridentata ssp. *xericensis/Agropyron spicatum*	003, 004, 007
Artemisia arbuscula/Agropyron spicatum	005, 006, 009
Eriogonum sphaerocephalum/Poa secunda	002, 008, 015
Eriogonum thymoides/Poa secunda	010, 012, 014
Lomatium grayi/Poa secunda	011
Crataegus douglasii	001, 013, 016

Plots were subjectively located in areas that appeared representative of the particular community type. Sampling was conducted in areas supporting late seral vegetation when possible. Upland plots were 10m by 10m in size, while riparian plots were 25m long and varied from 7-10m wide. Plots were not permanently marked. Sampling protocol follows Bourgeron et al. (1991), and Western Heritage Task Force Forms II and III were completed for each plot. The complete set of original data sheets are on file at the CDC office in Boise, with copies at the BLM's Lower Snake River District office in Boise. A sample of these field forms are in Appendix 5.

Rare plants

Cursory searches for rare plants were incorporated into our vegetation map field work. No new populations of BLM Sensitive or other rare plant species were discovered during this field work. Squawapple is the only rare plant species previously known to occur within the HMP Area. Potential habitat for at least two other species, Dermatocarpon (*Dermatocarpon lorenzianum*) and Snake River goldenweed (*Haplopappus radlanus*) is found within the HMP Area.

Squawapple (*Peraphyllum ramosissimum*)

Squawapple (*Peraphyllum ramosissimum*) is an intricately and rigidly branched deciduous shrub. It is the only BLM Sensitive plant species documented to occur within the HMP Area. *Peraphyllum* is a monotypic genus in the rose (Rosaceae) family. Its distribution extends from north-central Oregon, south along the east side of the Sierras through central California, and east to western Colorado and northeastern New Mexico (Shaw et al. 1991).

In Idaho, squawapple is known only from the Weiser/Mann Creek area in Washington County. Eastern Oregon populations of squawapple are restricted to a narrow transitional belt along the sagebrush and ponderosa pine forest interface, between 4,200 and 4,500 feet elevation (Johnson and Simon 1987). The nearest Oregon populations are found in the LaGrande area. Most populations in Idaho occur within the sagebrush-steppe zone below 4,000 feet elevation, usually in association with other shrub species.

Within the HMP Area, squawapple is known from three occurrences (CDC occurrences 005, 006, and 007) south of Fairchild Reservoir (Figure 3). We did not discover any new populations during our vegetation map surveys. We revisited two occurrences (005, 007) and obtained updated information (Appendix 6). The original location information associated with occurrence 007 was somewhat vague. This

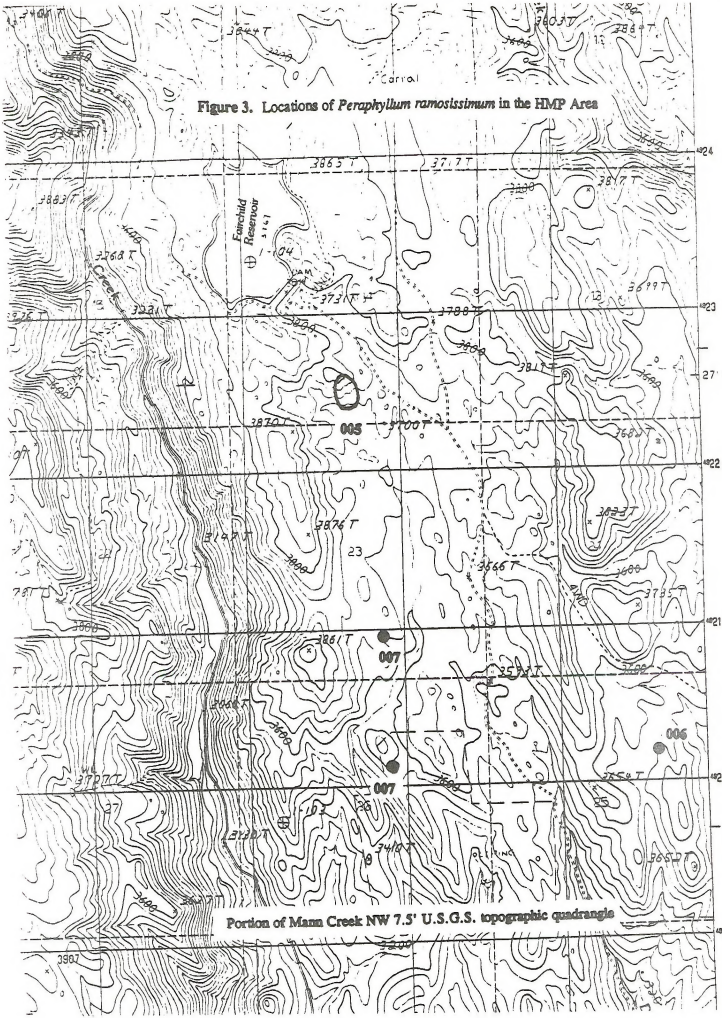


Figure 3. Locations of *Peraphyllum ramosissimum* in the HMP Area

Portion of Mann Creek NW 7.5' U.S.G.S. topographic quadrangle

occurrence is now known to be located a little south of where it was previously mapped, and consists of two separate subpopulations. We did not relocate occurrence 006, and its status is unknown.

Forage value of squawapple varies throughout its range (Smith 1974). Beside being browsed by wildlife and livestock, the fruits are used by birds and rodents. Plants from the HMP and nearby areas tend to be severely hedged, indicating their high palatability. Nearly all fruits were aborted on plants we observed in 1996. Additionally, few if any seedlings have been observed in recent years at sites that have been visited. Detailed information is lacking for the known occurrences within the HMP Area. Establishing monitoring plots, or at least reference photo points would help track these occurrences over time. The monitoring plan being developed for the HMP Area should incorporate squawapple populations as much as possible. Minimizing further deterioration of existing squawapple habitat is probably the most important conservation measure at known sites. Protecting and monitoring existing squawapple occurrences should receive priority over supplemental plantings.

Supplemental planting of squawapple within the HMP Area will require initial research regarding appropriate seed or rootstock availability. Seed collecting may be necessary to acquire sufficient material of the regional ecotype. When dealing with species of conservation concern such as squawapple, it is important to consider the long-term consequences of diluting the local genetic structure with introductions from other areas. Squawapple populations in Idaho are small and located along the periphery of the species' main distribution. These populations may be important from a conservation standpoint (Lesica and Allendorf 1992). We recommend using local seed or rootstock material for any squawapple augmentation within the HMP Area.

Initial survival of squawapple plantings is often low. Seedings grow slowly and may require protection for up to three years post-planting, but it is very persistent once established. The existence of distinct ecotypes that are possibly restricted to specific soil types makes selection of appropriate seed sources important (Shaw et al. 1991). Information regarding growing and planting squawapple is contained in several publications (Stark 1966; Smith 1974; Vories 1981; Belcher 1985; and Shaw et al. 1991).

Logical places for squawapple plantings would be sites with similar environmental and vegetation characteristics as nearby existing occurrences. Three general areas contain potentially suitable habitat - (1) near Fairchild Reservoir (portions of polygons 47, 52, 59, 61, 63, and the upper slopes of polygons 51 and 65); (2) the southeastern corner of the HMP Area (polygons 1, 2, and segments in 6, which is a large polygon); and (3) west of Mann Creek (portions of polygons 115 and 118). Mountain shrub planting as identified in the HMP, has been ongoing for several years. Squawapple plantings may be easier to accomplish in conjunction with these other shrub plantings. If supplemental squawapple planting is pursued, we recommend one to three initial sites be chosen, depending on the amount of material available. Monitoring and assessment of these sites should be conducted before a much larger effort is undertaken. Seed collection and rootstock production can be ongoing during this experimental period. This may require BLM coordination with a nursery or other cooperator.

Dermatocarpon (*Dermatocarpon lorenzianum*)

Dermatocarpon is a small, grayish-colored, squamulose lichen that grows attached to basalt pebbles in dry exposed habitats. It is apparently rare in North America, where only a few sites in California, Oregon, and Idaho are known (McCune and Goward 1995). In Idaho, dermatocarpon has been collected only from near the gravel pit near Midvale Hill, although it may extend into the nearby Buckwheat Flats RNA (R.

Rosentreter, Idaho BLM State Botanist, pers. comm., 1996). It is a BLM Sensitive species in Idaho (Conservation Data Center 1996). We did not observe the lichen within the RNA or HMP Area. We purposefully searched for dermatocarpon at only a few select sites, and it is possible we overlooked the lichen due to our inexperience with this species.

Snake River goldenweed (*Haplopappus radiatus*)

Snake River goldenweed is another BLM Sensitive plant species that potentially could occur within the HMP Area. No Snake River goldenweed was observed while conducting our field work for the vegetation map. Several populations of the robust form of the closely related Columbia goldenweed (*Haplopappus carthamoides* var. *carthamoides*) were found around Fairchild Reservoir. These populations contain individual plants which could pass as Snake River goldenweed. Other populations of Columbia goldenweed likely occur within the HMP Area. Information to help differentiate these two similar goldenweed taxa has been outlined (Mancuso and Moseley 1993).

Buckwheat Flats Research Natural Area

As part of our vegetation survey, we revisited the Buckwheat Flats RNA. Beside collecting information for the vegetation map, we also evaluated the area's conservation status and whether current management is consistent with BLM policy. The RNA consists of two segments, and is 200 acres in size (Figure 4). The eastern half of the RNA is located approximately 0.3 mile outside the HMP Area and supports a diverse vegetation. Scabby areas support *Eriogonum sphaerocephalum/Poa secunda*, *Eriogonum thymoides/Poa secunda*, and *Lomatium grayi/Poa secunda* plant communities. Plot 96MM011 is located in an example of the *L. grayi/P. secunda* cover type. Steep slopes in the center of the 80 acres burned during the early 1990's. Western and northeastern-facing slopes support *Agropyron spicatum-Poa secunda/Balsamorhiza sagittata* grassland vegetation that are mostly in mid-seral condition. Northern aspects east of Point 3363 support a few acres of the *Festuca idahoensis/Agropyron spicatum* habitat type. A patch of leafy spurge occurs in a small draw in this area (see Appendix 1). Many of the individual and small clumps of chokecherry scattered across these slopes burned, with apparently only spotty regeneration. Northeastern portions of the RNA support stands of *Purshia tridentata/Agropyron spicatum*, with at least one small area also containing some Idaho fescue. The vegetation across State Highway 95 appears to be mostly disturbed *Artemisia tridentata* ssp. *xericensis/Agropyron spicatum*, and limited amounts of scabland. The only known Idaho location for the BLM Sensitive lichen species *Dermatocarpon lorenzianum* (dermatocarpon) is near the gravel pit adjacent to the RNA. It also possibly occurs in the RNA. We did not observe the lichen within the RNA, but could have overlooked it due to our inexperience with this species.

Several factors are compromising the eastern 80 acre block of the RNA. Most seriously is expansion of the gravel pit closer to the RNA. There is a minor two-track road leading from the pit area to the northwestern corner of the RNA, and Highway 95 dissects the southeastern corner. Cattle were observed grazing just north of the RNA, and cowpies were scattered within its boundaries. There are no fences to prevent livestock accessing the RNA from the Sage Creek area. Bulbous bluegrass and annual bromes are well established within the RNA and a small patch of leafy spurge has been discovered.

The 120 acre western half of the RNA is located within the HMP Area. The gentle broad ridge complex is dominated by scabland vegetation. *Eriogonum sphaerocephalum/Poa secunda* is the most common community type, with smaller areas containing *Eriogonum thymoides/Poa secunda* and minor amounts of *Lomatium grayi/Poa secunda*. Plot 96MM010 was located in one of the *Eriogonum thymoides/Poa secunda*

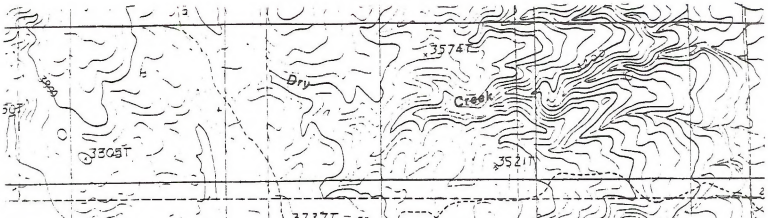
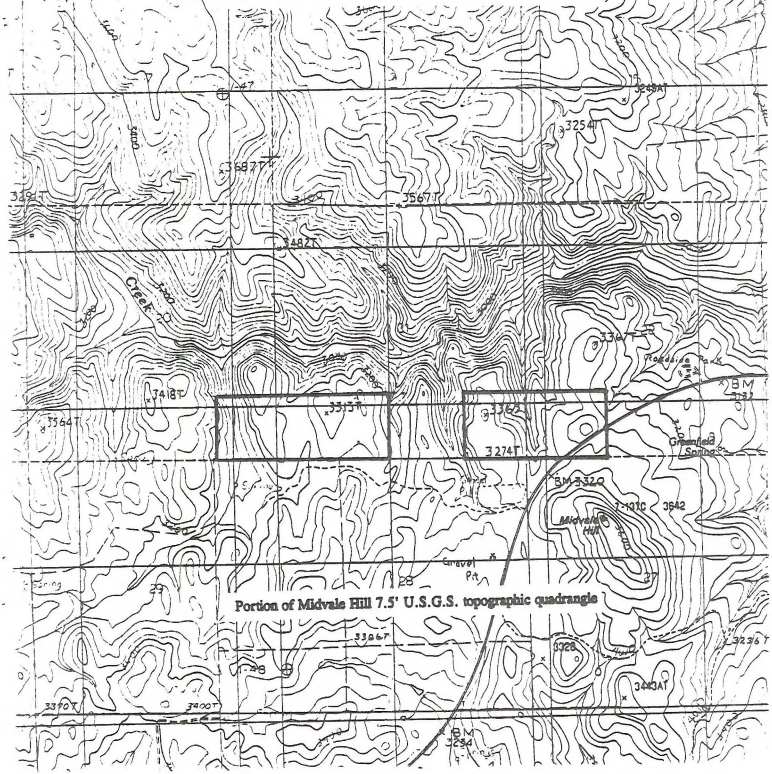


Figure 4. Location of Buckwheat Flats Research Natural Area



Portion of Midvale Hill 7.5' U.S.G.S. topographic quadrangle

communities. *Artemisia tridentata* ssp. *xericensis/Agropyron spicatum* and perhaps *Purshia tridentata/Agropyron spicatum* also occur along the broad ridgetop. These tall shrub areas contain abundant bulbous bluegrass with a mainly early seral herb layer. Bulbous bluegrass is also established within most scabland areas. Late seral condition *Agropyron spicatum-Poa secunda/Balsamorhiza sagitata* occurs along the steep, rocky, west to northeast-facing slopes above Sage Creek and a main tributary. Talus-shrub garlands also occur in this area. The steep north-facing slope above Sage Creek supports a *Festuca idahoensis/Agropyron spicatum* community in late seral condition. The western block of the RNA appears to be secure from threats, although cattle graze adjacent areas quite heavily, and weedy grasses are well established. Fences appeared to be intact in the areas we walked.

The Buckwheat Flats RNA was primarily established for its representation of *Eriogonum sphaerocephalum/Poa secunda* and *Eriogonum thymoides/Poa secunda* scabland vegetation. *Lomatium grayi/Poa secunda* is another scabland community type represented within the RNA. A Resource Management Plan Maintenance to change the boundaries of the RNA has been proposed by the BLM. The proposal would terminate the RNA designation for the 80 acres outside the HMP Area, north of Midvale Hill, and transfer the designation to T13N, R4W, Sec 20 NE1/4 SE1/4 and SE1/4 NE1/4. The transferred 80 acres would be contiguous with the existing western block of the RNA and within the HMP Area. One possible drawback of the proposal is losing RNA protection for an area that may be habitat for the rare lichen dermatocarpon. Despite this concern, we recommend the BLM proceed with the Plan Maintenance for several reasons:

1. The portion of the RNA to be terminated is jeopardized by several threats that are difficult to mitigate.
2. The proposed transfer lands are located within the HMP Area and would afford the RNA an additional level of resource protection. The transfer will increase the prospects for the RNA's long-term conservation.
3. The proposed transfer lands includes the steep west- and north-facing slopes above Sage Creek that were part of TNC's original RNA recommendation back in the mid-1980's. This area supports grassland vegetation in excellent ecological condition. The transfer also includes a segment of Sage Creek and its associated riparian vegetation, and adds to the diversity of habitats protected by the RNA.
4. The transfer will consolidate the RNA into a single block of land and facilitate management.

Scabland vegetation is widespread throughout the HMP Area, with the most extensive areas located north of Sage Creek and the RNA. There are additional large scabland habitats along the ridges east of Fairchild Reservoir that are within the "Hixon Preserve Field" and not grazed by livestock. This area probably contains the least threatened scabland vegetation in the HMP Area and any conservation plans for scabland vegetation types should include the "Hixon Preserve Field" as well.

Sharp-tailed grouse observations

During our field work, we observed sharp-tailed grouse on three separate occasions (Appendix 7). Three birds (adults?) were flushed from a grassy area on May 30th, in T13N, R4W, Sec 30 (polygon # 9). On May 31st, a single bird was observed in a saddle area in T13N, R5W, Sec 13 (polygon # 47). A hen and three chicks were seen on June 5th south of Fairchild Reservoir in T13N, R5W, Sec 14 (polygon # 48).

References

Belcher, E., chairman. 1985. Handbook on seeds of browse-shrubs and forbs. Technical Publication R8-TP8. Atlanta, GA: USDA, Forest Service, Southern Region. Prepared by the Browse, Shrub-Forb Committee of the Association of the Official Seed Analysis.

Bourgeron, P.S., R.L. DeVelice, L.D. Engelking, G. Jones, and E. Muldavin. 1991. WHTF site and community survey manual. Version 92B. Western Heritage Task Force, Boulder, CO. 24 p.

Bureau of Land Management. 1994. Hixon Columbian sharp-tailed grouse Habitat Management Plan. Unpublished report on file at Bureau of Land Management, Lower Snake River District, Boise, ID. 30 p., plus appendices.

Conservation Data Center. 1996. Biological and Conservation Data System, Element tracking files (December 1996), Idaho Department of Fish and Game, Boise, ID.

Crowe, E.A, and R.R. Clausnitzer. 1995. Mid-montane wetlands classification of the Malheur, Umatilla, and Wallowa-Whitman National Forests. USDA, Forest Service, Pacific Northwest Region, Wallowa-Whitman National Forest, Baker City, OR. 188 p., plus appendices. Draft.

Daubenmire, R. 1970. Steppe vegetation of Washington. Technical Bulletin 62. Pullman, WA: Washington Agricultural Experiment Station. 131 p.

Ertter, B., and B. Moseley. 1992. Floristic regions of Idaho. Journal of the Idaho Academy of Science 28:57-70.

Evenden, A.G. 1989. Ecology and distribution of riparian vegetation in the Trout Creek Mountains of southeastern Oregon. Ph.D. Dissertation. Oregon State University, Corvallis, OR. 128 p.

Fitzgerald, J.F. 1982. Geology and basalt stratigraphy of the Weiser Embayment, west-central Idaho. Pages 103-128, *In*: Cenozoic geology of Idaho; B. Bonnichsen, and R.M. Breckenridge eds. Idaho Bureau of Mines and Geology, University of Idaho, Moscow.

Grossman, D.H., K.L. Goodin, and C.L. Reuss, eds. 1994. Rare plant communities of the conterminous United States. An initial survey. Prepared by The Nature Conservancy, Arlington, VA. 620 p.

Hall, F.C. 1973. Plant communities of the Blue Mountains of Oregon. R6-ECOL-79-001. USDA, Forest Service, Pacific Northwest Region, Portland OR.

Hall, F.C., L. Bryant, R. Clausnitzer, K. Geier-Hayes, R. Keane, J. Kertis, A. Shlisky, and R. Steele. 1995. Definitions and codes for seral status and structure of vegetation. Gen. Tech. Rep. PNW-GTR-363. Portland, OR: USDA, Forest Service, Pacific Northwest Research Station. 39 p.

Hansen, P.L., R.D. Pfister, K. Boggs, B.J. Cook, J. Joy, and D.K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous publication No. 54. University of Montana, Montana Forest and Conservation Experiment Station, School of Forestry, Missoula. 646 p.

Hironaka, M., M.A. Fosberg, and A.H. Winward. 1983. Sagebrush-grass habitat types of southern Idaho. Bulletin No. 35. Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow. 44 p.

Hitchcock, C.L., and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle, WA. 730 p.

Huschle, G. 1975. Analysis of the vegetation along the middle and lower Snake River. M.S. Thesis. University of Idaho, Moscow. 271 p.

Johnson, C.G., and S.A. Simon. 1987. Plant associations of the Wallowa-Snake Province. R6-ECOL-TP-255A-86. USDA, Forest Service, Pacific Northwest Region, Wallowa-Whitman National Forest, Baker City, OR. 399 p., plus appendices.

Johnson, F.D. 1981. Idaho: climate/vegetation life zone data. Forestry, Wildlife and Range Science Experiment Station, University of Idaho, Moscow.

Kauffman, J.B., W.C. Krueger, and M. Vavra. 1985. Ecology and plant communities of the riparian area associated with Catherine Creek in northeastern Oregon. Agricultural Experiment Station Technical Bulletin 147. Oregon State University, Corvallis. 35 p.

Kovalchik, B.L. 1987. Riparian zone associations of the Deschutes, Fremont, Ochoco and Winema National Forests. R6-ECOL-TP-279-87. USDA, Forest Service, Pacific Northwest Region, Portland, OR. 171 p.

Lesica, P., and F.W. Allendorf. 1992. Are small populations worth preserving? Conservation Biology 6(1):135-139.

Mancuso, M. 1995. A vegetation map of the Rocking M Ranch, upper Dennett Creek/Raft Creek Wildlife Conservation Easement Area, Washington County, Idaho. Unpublished report on file at Idaho Department of Fish and Game, Boise, ID. 38 p., plus appendices.

Mancuso, M., and R. Moseley. 1993. Report on the conservation status of *Haplopappus radianus* in Idaho. Status survey report prepared for the Idaho Department of Parks and Recreation, Boise, ID. 32 p., plus appendices.

Mancuso, M., and R. Moseley. 1995. A vegetation map for Brownlee Wildlife Management Area, Washington County, Idaho. Unpublished report on file at Idaho Department of Fish and Game, Boise, ID. 72 p., plus appendices.

Manning, M.E., and W.G. Padgett. 1995. Riparian community type classification for Humboldt and Toiyabe National Forests, Nevada and eastern California. R4-ECOL-95-01. USDA, Forest Service, Intermountain Region, Ogden, UT. 306 p.

Marks J.S., and V. Saab Marks. 1987. Habitat selection by Columbian sharp-tailed grouse in west-central Idaho. Unpublished report on file at Bureau of Land Management, Lower Snake River District, Boise, ID. 115 p.

McCune, B., and T. Goward. 1995. Macrolichens of the northern Rocky Mountains. Mad River Press, Eureka, CA. 208 p.

McNab, W.H., and P.E. Avers, compilers. 1994. Ecological subregions of the United States: Section descriptions. WO-WSA-5. USDA, Forest Service, Washington, D.C.

Miller, T.B. 1976. Ecology of riparian communities dominated by white alder in western Idaho. M.S. Thesis, University of Idaho, Moscow. 154 p.

Mitchell, V.E., and E.H. Bennett, compilers. 1979. Geologic map of the Baker quadrangle, Idaho. 1:250,000 scale. Idaho Bureau of Mines and Geology, Moscow, ID.

Omernik, J.M., and A.L. Gallant. 1986. Ecoregions of the Pacific Northwest. EPA/600/3-86/033. U.S. Environmental Protection Agency, Environmental Research Laboratory, Corvallis, OR. 39 p.

Padgett, W.G., A.P. Youngblood, and A.H. Winward. 1989. Riparian community type classification of Utah and southeastern Idaho. Gen. Tech. Rep. R4-ECOL-89-01. Ogden, UT: USDA, Forest Service. 191 p.

Roberts, R.W. 1971. Bitter cherry vegetation on the Boise National Forest. M.S. Thesis, University of Idaho, Moscow. 53 p.

Rosentreter, R., and R.G. Kelsey. 1991. Xeric big sagebrush, a new subspecies in the *Artemisia tridentata* complex. Journal of Range Management 44(4):330-335.

Ross, S.H., and C.N. Savage. 1967. Idaho earth science: geology, fossils, climate, water, and soils. Idaho Bureau of Mines and Geology, Earth Science Series No. 1, Moscow, ID. 271 p.

Shaw, N.L., Monsen, S.B., and R. Stevens. 1991. Chapter IV-3, Rosaceae *In*: Monsen, S.B., and R. Stevens, compilers; Restoring range and wildlife habitat in the Intermountain Region. Gen. Tech. Rep. Ogden, UT: USDA, Forest Service, Intermountain Research Station. Draft.

Smith, J. 1974. *Peraphyllum ramosissimum* Nutt. Pages 576-577 *In*: Seeds of woody plants in the United States; C.S. Schopmeyer, Technical Coordinator. Agricultural Handbook No. 450. USDA, Forest Service, Washington D.C.

Soil Conservation Service. 1992. Soil survey of Adams-Washington area, Idaho, parts of Adams and Washington counties. Draft.

Stark, N. 1966. Review of highway planting information appropriate to Nevada. College of Agriculture Bulletin No. B-7. Desert Research Institute, University of Nevada, Reno.

Steele, R., R.D. Pfister, R.A. Ryker, and J.A. Kittams. 1981. Forest habitat types of central Idaho. Gen. Tech. Rep. INT-114. Ogden, UT: USDA, Forest Service, Intermountain Forest and Range Experiment Station. 138 p.

Steele, R., and K. Geier-Hayes. 1989. The Douglas-fir/ninebark habitat type in central Idaho: succession and management. Gen. Tech. Rep. INT-252. Ogden, UT: USDA, Forest Service, Intermountain Research Station. 65 p.

Steele, R., and K. Geier-Hayes. 1993. The Douglas-fir/pinegrass habitat type in central Idaho: succession and management. Gen. Tech. Rep. INT-298. Ogden, UT: USDA, Forest Service, Intermountain Research Station. 83 p.

Thomas, J.W., tech. ed. 1979. Wildlife habitats in managed forests: the Blue Mountains of Oregon and Washington. Agricultural Handbook 553. USDA, Forest Service, Washington, D.C. 512 p.

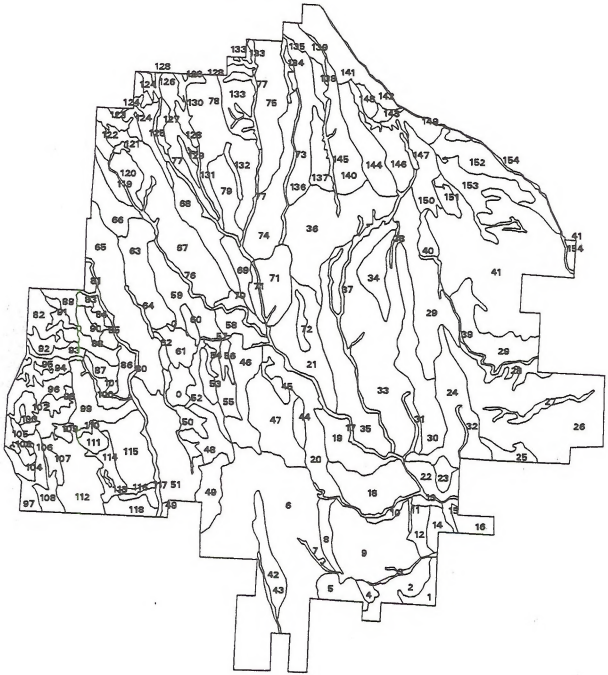
Tisdale, E.W. 1986. Canyon grasslands and associated shrublands of west-central Idaho and adjacent areas. Bulletin No. 40. Forest, Wildlife, and Range Experiment Station, University of Idaho, Moscow. 42 p.

Vories, K.C. 1981. Growing Colorado plants from seed: a state of the art. Vol. I: Shrubs. Gen. Tech. Rep. INT-103. Ogden, UT: USDA, Forest Service, Intermountain Research Station. 80 p.

Winward, A.H., and E.W. Tisdale. 1977. Taxonomy of the *Artemisia tridentata* complex in Idaho. Bulletin No. 19. Forest, Wildlife, and Range Experiment Station, University of Idaho, Moscow. 15 p.

Vegetation Map for the Hixon Columbian Sharp-tailed Grouse Habitat Management Plan Area

The cover type for each polygon is explained in the text.



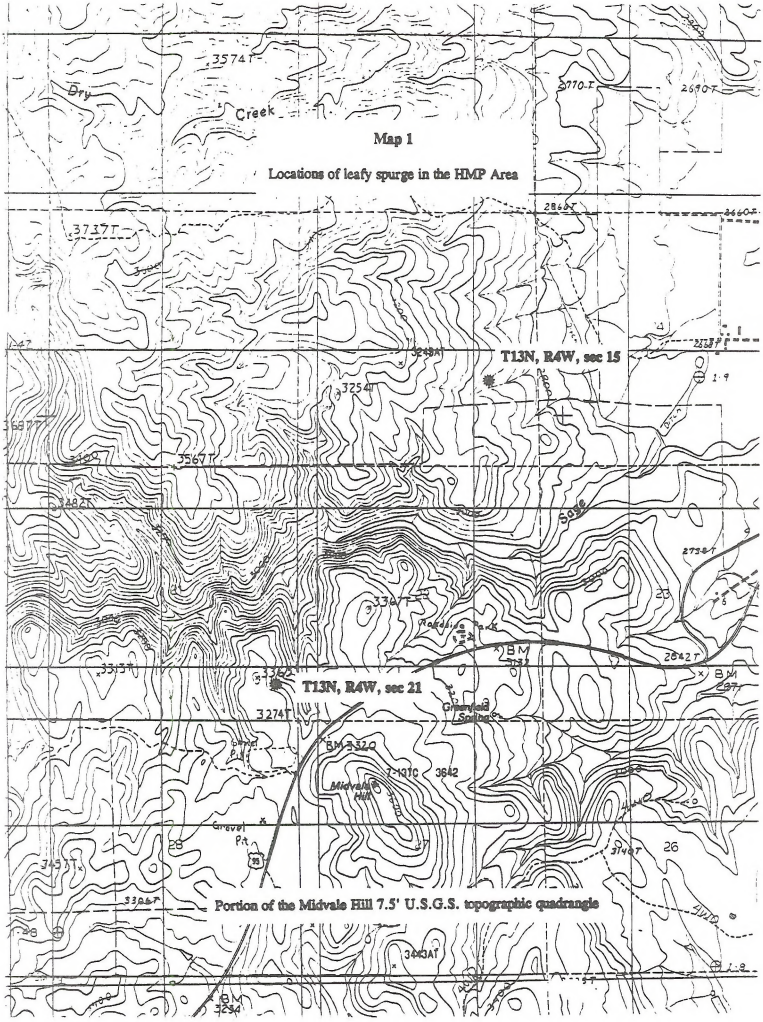
1:24,000 scale copies of the vegetation map are available from the Conservation Data Center (Idaho Department of Fish and Game, P.O. Box 25, 600 S. Walnut, Boise, ID 83707).

Appendix 1

Locations of leafy spurge (*Euphorbia esula*) within the HMP Area.

Map 1. Portion of Midvale Hill 7.5' U.S.G.S. topographic quadrangle.

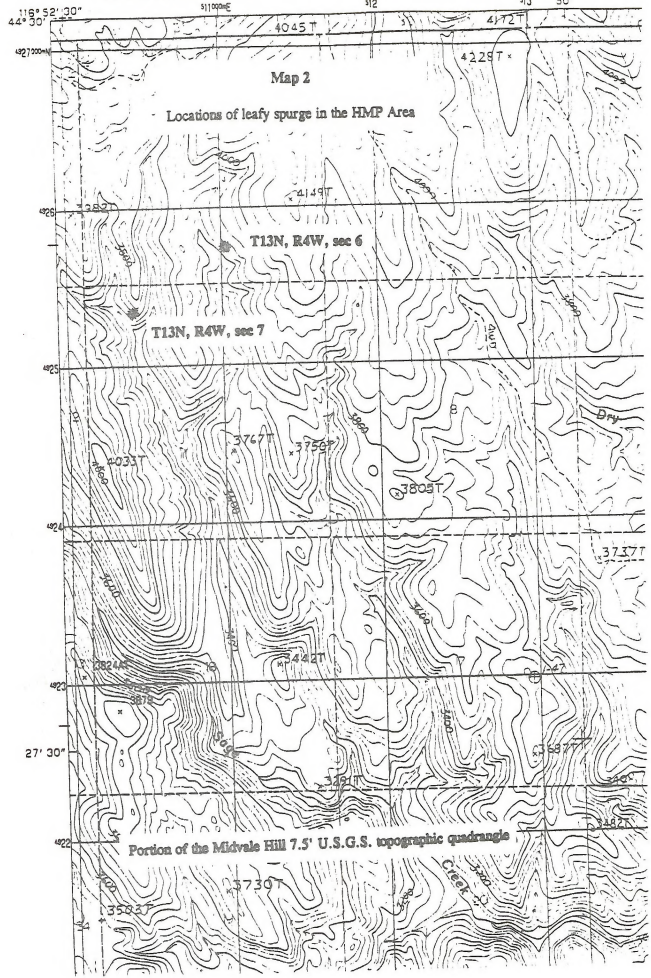
Map 2. Portion of Midvale Hill 7.5' U.S.G.S. topographic quadrangle.



Map 1

Locations of leafy spurge in the HMP Area

DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



Appendix 2

Size, cover type, inclusions, and ecological condition summary for the vegetation map polygons.

Interpretation of Appendix 2:

Polygon #	The vegetation map is comprised of 154 polygons (map units), numbered 1 to 154.
Size	Polygon size in acres as determined by GIS.
Cover type	The cover type code names are provided in Table 2.
Inclusion	1 = ARTTRX 2 = ARTARB 3 = AGRSPI 4 = POABUL 5 = AGRINT 6 = ERISPH 7 = ERITHY 8 = LOMGRA 9 = MTSHRUB 10 = PSEMEN 11 = CRADOU 12 = ALNINC 13 = ALNRHO
Ecological condition	Y = yes, the selected ecological condition occurs in the polygon N = no, the selected ecological condition does not occur in the polygon 0 = no ecological condition assessed for the polygon

Size, cover type, inclusions, and ecological condition summary for the vegetation map polygons.

Polygon #	Size	Cover type	Inclusions	Ecological condition		
				Early seral	Mid-seral	Late seral
1	83	ARTTRX		Y	Y	N
2	189	ARTTRX		Y	Y	N
3	27	CRADOU		0	0	0
4	34	ERISPH		0	0	0
5	123	AGRINT		Y	N	N
6	1,879	ARTTRX	2	Y	Y	N
7	17	CRADOU		0	0	0
8	90	ERISPH		N	Y	Y
9	606	POABUL	1, 2, 9	Y	N	N
10	33	ARTTRX		N	N	Y
11	12	CRADOU		0	0	0
12	94	ARTTRX		N	Y	N
13	27	ARTTRX		N	N	Y
14	80	ERISPH	1	N	Y	Y
15	33	AGRSPI		N	N	Y
16	90	ERISPH	1, 7, 8	Y	Y	N
17	172	ALNINC	11	0	0	0
18	349	POABUL	1, 9	Y	N	N
19	238	MTSHRUB		0	0	0
20	358	AGRSPI		Y	Y	Y
21	402	AGRSPI		Y	Y	Y
22	121	AGRSPI		Y	N	N
23	58	ERISPH	7, 8	0	0	0
24	463	AGRSPI	9, 11	N	Y	N
25	79	ARTTRX	9	0	0	0
26	1,158	ERISPH	1, 7, 9	0	0	0
27	73	ARTTRX	9	Y	N	N
28	99	ARTTRX	9	Y	N	N

Polygon #	Size	Cover type	Inclusions	Ecological condition		
				Early seral	Mid-seral	Late seral
29	868	ERISPH	1, 9	0	0	0
30	431	ERISPH	3, 7	0	0	0
31	26	CRADOU		0	0	0
32	16	CRADOU		0	0	0
33	1,037	AGRSPI		N	Y	N
34	177	ERISPH	1, 3, 7	0	0	0
35	533	AGRSPI		N	Y	N
36	730	ERISPH	9	0	0	0
37	171	ALNINC	11	0	0	0
38	13	MTSHRUB		0	0	0
39	58	CRADOU		0	0	0
40	70	MTSHRUB	1, 6	0	0	0
41	1,433	ARTTRX	9, 11	N	Y	N
42	26	CRADOU		0	0	0
43	176	ERISPH	1	0	0	0
44	60	POABUL		Y	N	N
45	49	ERISPH	7	0	0	0
46	279	ERISPH	1, 9	Y	Y	N
47	374	AGRSPI	9	Y	Y	N
48	164	ARTARB	9	N	Y	N
49	177	ERISPH	1, 2, 9	0	0	0
50	116	MTSHRUB		0	0	0
51	458	ARTTRX	9	N	N	Y
52	121	ARTTRX	9	N	Y	N
53	61	ERISPH	7	N	N	Y
54	24	MTSHRUB	1	0	0	0
55	124	POABUL	2, 6	Y	N	N
56	44	MTSHRUB	1	0	0	0
57	8	CRADOU		0	0	0

Polygon #	Size	Cover type	Inclusions	Ecological condition		
				Early seral	Mid-seral	Late seral
58	119	ARTTRX	6, 9	Y	Y	N
59	283	ARTTRX	9, 10	0	0	0
60	41	ERISPH	7	N	Y	Y
61	122	MTSHRUB		0	0	0
62	30	ARTARB		N	Y	Y
63	345	ARTTRX	2, 9, 10	0	0	0
64	23	PSEMEN		0	0	0
65	586	AGRSPI	6, 7, 10	N	Y	Y
66	182	ERISPH	1, 2, 7	0	0	0
67	659	ERISPH	1, 2, 9	0	0	0
68	259	MTSHRUB	1, 6	0	0	0
69	113	ERISPH	1, 9	Y	Y	Y
70	59	ARTTRX	6, 9	Y	Y	N
71	286	ARTTRX	9	Y	Y	N
72	53	ERISPH	3, 7	0	0	0
73	46	CRADOU		0	0	0
74	402	POABUL	1, 6, 9	Y	N	N
75	430	AGRSPI	1, 6, 9	Y	Y	N
76	105	CRADOU		0	0	0
77	212	CRADOU	12	0	0	0
78	550	ARTTRX	6, 9, 10	0	0	0
79	180	MTSHRUB	2	0	0	0
80	122	ALNRHO		0	0	0
81	31	AGRSPI	10	N	Y	Y
82	151	ARTTRX	6, 9	N	Y	Y
83	20	PSEMEN		0	0	0
84	33	MTSHRUB	1	0	0	0
85	59	AGRSPI		N	Y	Y
86	81	AGRSPI	1	N	Y	Y

Polygon #	Size	Cover type	Inclusions	Ecological condition		
				Early seral	Mid-seral	Late seral
87	72	ARTTRX		N	Y	Y
88	70	PSEMEN		0	0	0
89	74	ARTTRX	8	N	Y	N
90	53	ARTTRX	9	N	Y	N
91	48	PSEMEN		0	0	0
92	70	ARTTRX	6, 9	N	Y	Y
93	59	ARTTRX		N	Y	N
94	112	PSEMEN		0	0	0
95	13	ARTTRX		N	Y	N
96	249	ARTTRX	2, 9	Y	Y	N
97	150	ERISPH	3	Y	Y	Y
98	48	PSEMEN	9	0	0	0
99	222	AGRSPI	1, 8, 9	N	Y	N
100	49	PSEMEN		0	0	0
101	41	MTSHRUB	3	0	0	0
102	78	MTSHRUB		0	0	0
103	14	ARTTRX		N	Y	N
104	52	POABUL		Y	N	N
105	65	ARTTRX	9	Y	Y	N
106	14	PSEMEN		0	0	0
107	45	ERISPH	1, 7	0	0	0
108	86	MTSHRUB	1	0	0	0
109	27	PSEMEN		0	0	0
110	13	PSEMEN		0	0	0
111	60	ARTTRX	9	Y	Y	N
112	355	ARTTRX	9	N	Y	Y
113	36	CRADOU		0	0	0
114	82	ARTTRX	2	Y	N	N
115	303	ARTTRX	9	N	Y	N

Polygon #	Size	Cover type	Inclusions	Ecological condition		
				Early seral	Mid-seral	Late seral
116	22	PSEMEN		0	0	0
117	38	MTSHRUB		0	0	0
118	100	ARTTRX	4	N	Y	N
119	73	MTSHRUB	1, 10	0	0	0
120	112	ERISPH	1, 7, 9	0	0	0
121	12	PSEMEN		0	0	0
122	45	ERISPH		N	Y	N
123	58	PSEMEN	1	0	0	0
124	96	ERISPH		0	0	0
125	113	MTSHRUB	1, 10	0	0	0
126	41	PSEMEN		0	0	0
127	48	ARTTRX	6, 9	0	0	0
128	236	ERISPH	3, 9	0	0	0
129	34	MTSHRUB		0	0	0
130	97	MTSHRUB		0	0	0
131	26	CRADOU		0	0	0
132	33	ERISPH		0	0	0
133	222	ARTTRX	6, 9	0	0	0
134	30	MTSHRUB		0	0	0
135	11	PSEMEN		0	0	0
136	328	ARTTRX		0	0	0
137	140	ARTTRX	9	N	Y	Y
138	55	MTSHRUB	1	0	0	0
139	94	PSEMEN		0	0	0
140	296	POABUL	3, 8, 9	Y	N	N
141	325	PSEMEN	3	0	0	0
142	44	ERISPH	8	0	0	0
143	32	AGRSPI	8	Y	Y	N
144	279	MTSHRUB	1, 10	0	0	0

Polygon #	Size	Cover type	Inclusions	Ecological condition		
				Early seral	Mid-seral	Late seral
145	49	PSEMEN	11	0	0	0
146	182	ERISPH	1, 8	0	0	0
147	19	MTSHRUB	10	0	0	0
148	37	MTSHRUB		0	0	0
149	131	PSEMEN		0	0	0
150	196	ARTTRX	6	Y	N	N
151	58	MTSHRUB		0	0	0
152	298	ARTTRX	8, 9	Y	Y	N
153	295	MTSHRUB	1	0	0	0
154	60	ALNINC		0	0	0

Appendix 3

Average relative cover and constancy values for six community types in the HMP Area.

Cover class code values used for Appendix 3 follow Bourgeron et al. (1991).

Code	Class	Midpoint
1	< 1%	0.5%
3	1% to 4.9%	3%
10	5% to 14.9%	10%
20	15% to 24.9 %	20%
30	25% to 34.9%	30%
40	35% to 44.9%	40%
50	45% to 54.9%	50%
60	55% to 64.9%	60%
70	65% to 74.9%	70%
80	75% to 84.9%	80%
90	85% to 94.9%	90%
98	95% to 100%	97.5%

Ground cover attribute definitions also follow Bourgeron et al. (1991).

Bare soil - bare soil (particles < 1/16 in. dia.)
Gravel - gravel (particles 1/16 to 3 in. dia.)
Rock - rock (particles > 3 in. dia.)
Litter - litter and duff (includes freshly-fallen leaves, needles, twigs, bark, fruits; duff is fermentation layer and humus layer)
Wood - wood (downed fragments > 1/4 in. dia.)
Moss - moss (includes club mosses, and for purposes of this study, lichens as well)
Basal vegetation - basal vegetation (the area occupied by root crowns and stems, not canopy cover)
Water - water (surface water)

Average relative canopy cover and constancy (in parentheses) of ground cover attributes, life-classes, and vascular plant species in six community types from the HMP Area.

	Artrtr/ Agrspi n=3	Artarb/ Agrspi n=3	Erisph/ Poasec n=3	Erithy/ Poasec n=3	Lomgra/ Poasec n=1	Cradou n=3
Ground Cover						
bare soil	60	70	20	10	10	20
gravel	1	3	50	60	80	3
rock	1	1	30	30	10	3
litter	30	20	3	3	3	60
wood	1	3	1	1	0	3
moss	3	3	1	1	1	1
basal vegetation	10	10	3	3	3	10
water	0	0	0	0	0	10
Life-class cover						
Shrubs	30	20	10	3	0	90
Forbs	20	10	10	3	20	10
Graminoids	30	30	10	3	10	20
Shrubs						
Amelanchia alnifolia						1 (66)
Artemisia arbuscula		20 (100)				
Artemisia tridentata xericensis	20 (100)					
Chrysothamnus nauseosus	1 (33)					
Crataegus douglasii						80 (100)
Eriogonum elatum	1 (33)					
Eriogonum heracleoides	3 (66)					
Eriogonum sphaerocephalum			10 (100)			
Eriogonum thymoides			1 (66)	3 (100)		
Prunus virginiana						3 (100)
Purshia tridentata	10 (100)	3 (66)				
Ribes aureum						3 (100)
Rosa woodsii						10 (100)
Salix geyeriana						20 (66)

	Artirz/ Agrspi n=3	Artarb/ Agrspi n=3	Erisph/ Poasec n=3	Erithy/ Poasec n=3	Lomgra/ Poasec n=1	Cradou n=3
Symphoricarpos albus						1 (33)
Forbs						
Achillea millefolium	3 (100)	3 (100)	1 (33)			1 (100)
Agoseris glauca	1 (33)	1 (33)				
Allium acuminatum		1 (33)	1 (66)		1 (100)	
Allium parvum			1 (66)	1 (66)		
Antennaria flagellaris				1 (33)		
Antennaria luzulina		10 (66)				
Arabis sparsiflora		1 (33)				
Arabis sp.		1 (33)	1 (33)	1 (33)		
Arenaria congesta		1 (66)				
Artemisia ludoviciana						1 (33)
Balsamorhiza hookeri		1 (33)	1 (33)	1 (33)	3 (100)	
Balsamorhiza sagittata	10 (100)	3 (3)				
Brodiaea douglasii	1 (33)	1 (33)				
Calochortus eurycarpus	1 (66)	1 (100)				
Castilleja chromosa		1 (33)				
Cerastium sp.		1 (33)				
Clarkia pulchella	3 (33)					
Collomia linearis	1 (33)		1 (33)			
Commandra umbellata	1 (33)					
Crepis occidentalis	1 (100)	1 (33)				
Epilobium glabberimum						3 (33)
Epilobium paniculatum		1 (100)				
Fragaria vesca						1 (33)
Galium aparine	1 (33)	1 (33)				1 (33)
Geum macrophyllum						1 (33)
Haplopappus lanuginosus		1 (33)				
Hydrophyllum capitatum	1 (33)					
Lomatium grayi			3 (66)		20 (100)	
Lomatium leptocarpum		1 (33)	3 (66)	3 (66)		

	Artrrx/ Agrspi n=3	Artarb/ Agrspi n=3	Eriaph/ Poasec n=3	Erithy/ Poasec n=3	Lomgra/ Poasec n=1	Cradou n=3
Lomatium nudicaule	3 (33)	3 (66)		1 (33)		1 (33)
Lotus purshiana		3 (33)				
Lupinus laxiflorus	3 (66)	1 (33)				1 (33)
Melilotus officinale						3 (33)
Mentha arvensis						1 (33)
Microseris troximoides	1 (33)		1 (100)	1 (100)	1 (100)	
Mimulus guttatus						1 (33)
Montia perfoliata		1 (33)				
Myosotis discolor		1 (33)				
Naverettia intertexta		3 (100)				
Nepeta cataria						1 (33)
Orobanche fasciculata				1 (33)		
Osmorhiza chilensis						3 (66)
Penstemon gairdneri		1 (66)	1 (33)			
Penstemon glandulosus	1 (33)					
Perideridia bolanderi						1 (66)
Phacelia heterophylla	1 (66)					
Phacelia linearis	1 (33)					
Phlox longifolia	1 (33)					
Phoenocaulis cherianthoides				1 (66)		
Plagiobothrys scouleri		1 (66)				
Polygonum douglasii			3 (100)	3 (100)	3 (100)	
Polygonum kelloggii		1 (66)				
Potentilla gracilis						1 (33)
Rumex crispus						1 (33)
Senecio foetidus						1 (33)
Senecio integgrimus	1 (66)	1 (66)				
Senecio triangularis						1 (33)
Sidalcea oregana	1 (33)	3 (33)				1 (33)
Taraxacum officinale						1 (66)

	Artrtr/ Agrspi n=3	Artarb/ Agrspi n=3	Erisph/ Poasec n=3	Erithy/ Poasec n=3	Lomgra/ Poasec n=1	Cradou n=3
Tragopogon dubius	1 (66)	1 (33)	1 (66)	1 (33)		1 (33)
Trifolium longipes						1 (33)
Trifolium macrocephalum			3 (66)	1 (33)	1 (100)	
Verbascum thaspus						1 (33)
Vicia americana						1 (33)
Viola sp.						1 (33)
Wyethia amplexicaulis						1 (33)
Graminoids						
Agropyron spicatum	20 (100)	20 (100)			1 (100)	
Alopecurus aequalis						1 (33)
Bromus briaziformis	1 (33)			1 (66)		
Bromus japonicus	1 (66)		1 (33)	1 (66)	1 (100)	
Bromus mollis	1 (33)		1 (33)	1 (33)		
Bromus tectorum	1 (33)		1 (33)	1 (33)	1 (100)	
Carex microptera						3 (33)
Danthonia unispicata		1 (33)				
Elymus glaucus						3 (66)
Festuca bromoides	1 (33)		1 (33)			
Glyceria sp.						1 (330
Koelaria cristata	3 (33)					
Melica bulbosa	3 (33)	1 (33)				
Poa bulbosa	10 (66)	10 (100)	3 (100)	3 (100)	3 (100)	20 (33)
Poa pratensis						10 (100)
Poa secunda	1 (66)	3 (100)	10 (100)	1 (100)	3 (100)	
Scirpus microcarpus						3 (66)
Sitanion hystrix	1 (33)	3 (33)	3 (66)	1 (66)	1 (100)	
Stipa lettermannii	1 (33)					
Stipa occidentalis	3 (33)					

Appendix 4

Location of vegetation sample plots in the HMP Area.

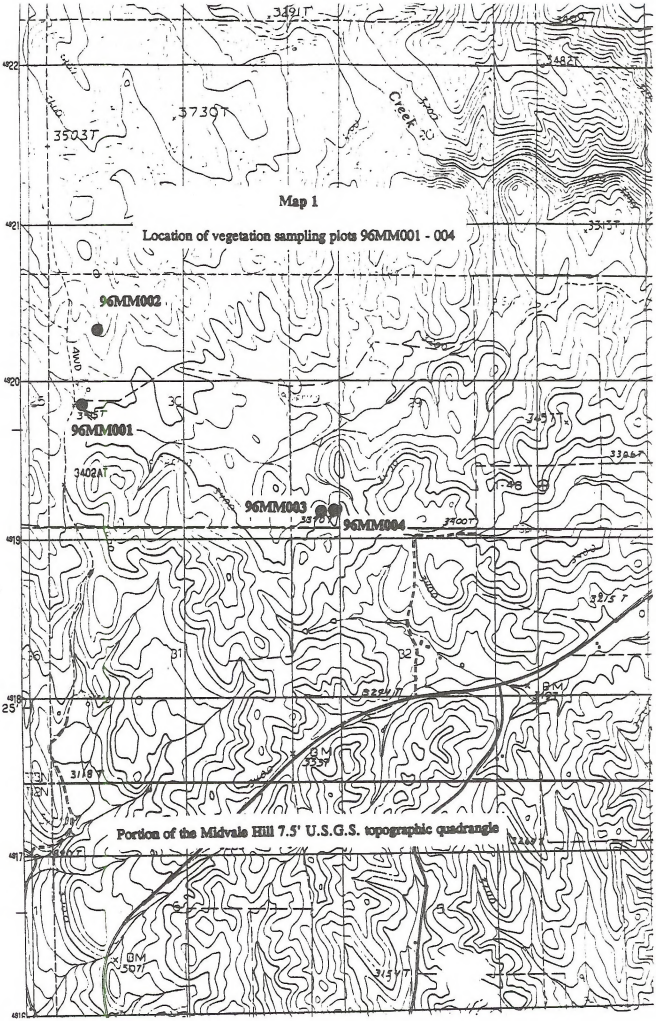
Map 1. Plots 96MM001 - 004. Portion of Midvale Hill 7.5' U.S.G.S. topographic quadrangle.

Map 2. Plots 96MM005 - 009; 016. Portion of Mann Creek 7.5' U.S.G.S. topographic quadrangle.

Map 3. Plots 96MM010 - 012. Portion of Midvale Hill 7.5' U.S.G.S. topographic quadrangle.

Map 4. Plot 96MM014. Portion of Midvale Hill 7.5' U.S.G.S. topographic quadrangle.

Map 5. Plots 96MM013 and 015. Portion of Hopper Creek 7.5' U.S.G.S. topographic quadrangle.



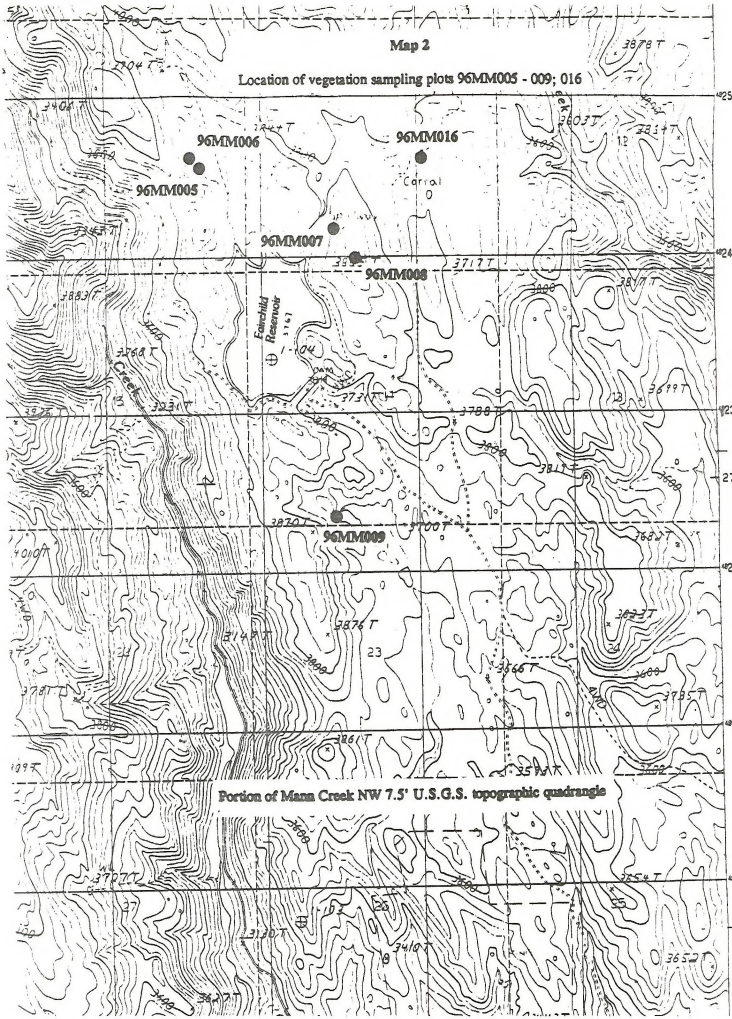
Map 1

Location of vegetation sampling plots 96MM001 - 004

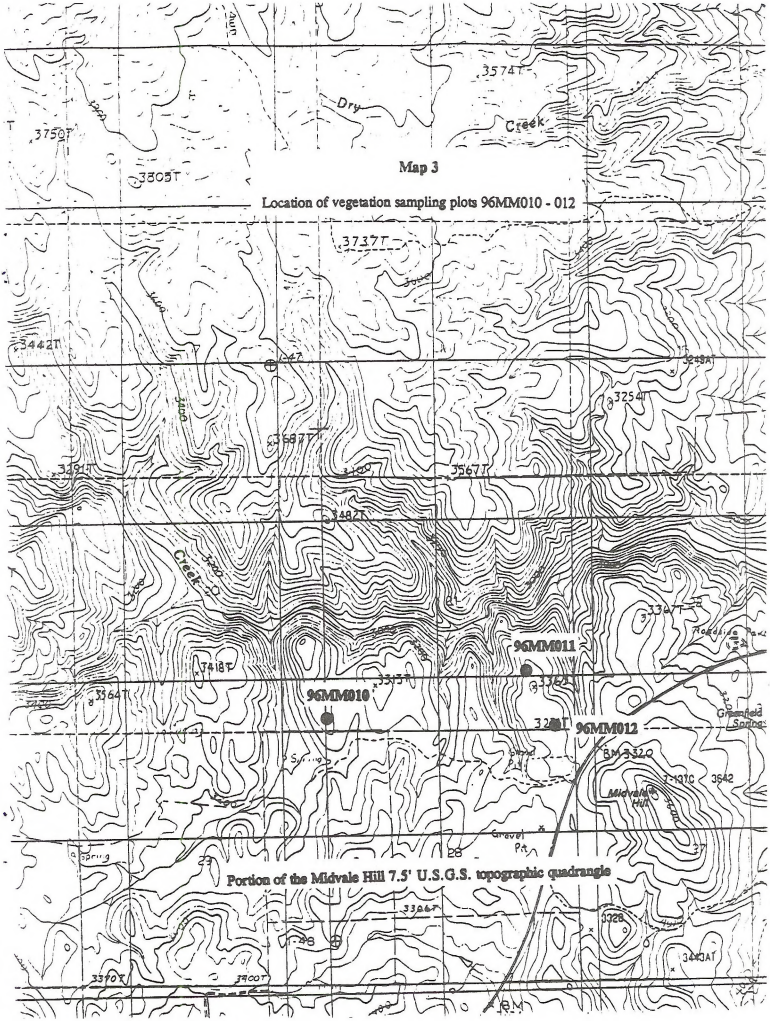
Portion of the Midvale Hill 7.5' U.S.G.S. topographic quadrangle

Map 2

Location of vegetation sampling plots 96MM005 - 009; 016



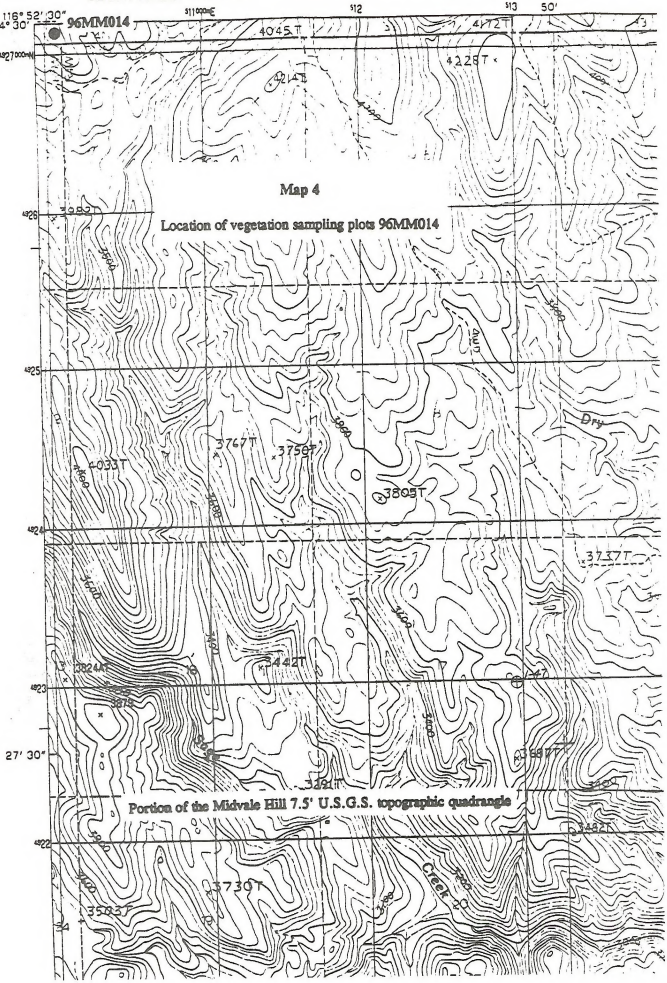
Portion of Mann Creek NW 7.5' U.S.G.S. topographic quadrangle



Map 3

Location of vegetation sampling plots 96MM010 - 012

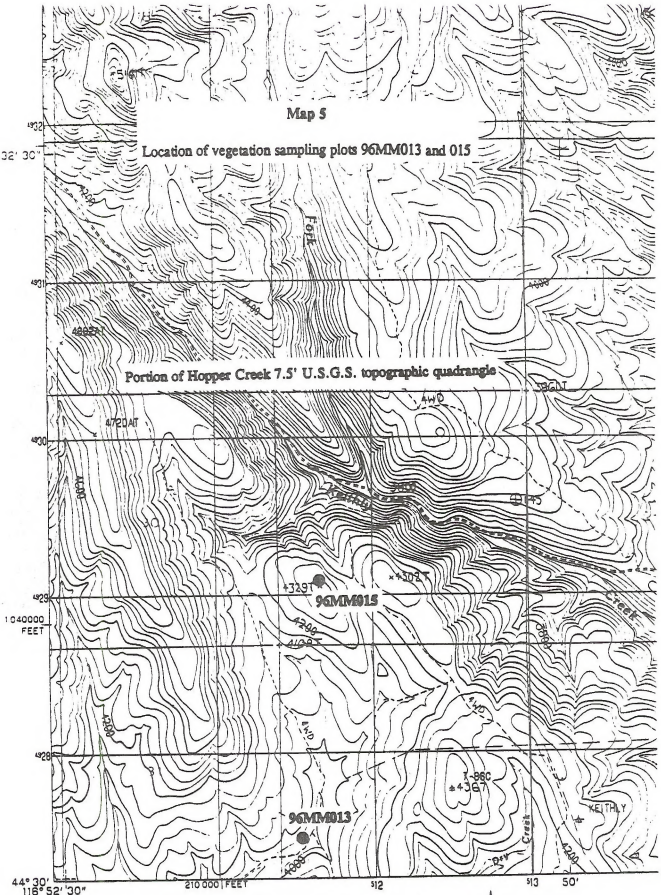
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



Map 4

Location of vegetation sampling plots 96MM014

Portion of the Midvale Hill 7.5' U.S.G.S. topographic quadrangle


Map 5
Location of vegetation sampling plots 96MM013 and 015
Portion of Hopper Creek 7.5' U.S.G.S. topographic quadrangle
32' 30"
4920
4910
4900
4890
4880
4870
4860
4850
4840
4830
4820
4810
4800
4790
4780
4770
4760
4750
4740
4730
4720
4710
4700
4690
4680
4670
4660
4650
4640
4630
4620
4610
4600
4590
4580
4570
4560
4550
4540
4530

Appendix 5

Western Heritage Task Force plot forms II and III.

FORM II. COMMUNITY SURVEY FORM

WHTF
10/30/92

GENERAL PLOT DATA

IDENTIFICATION AND LOCATION

SOURCECODE_____ MANUAL_____ UNITS __ft __m
PLOT NO._____ MO____ DAY___ YEAR____ EOCODE_____*___
EXAMINER(s) _____
PNC_____ CT_____
SITE_____ STATE_____ COUNTY_____
PURP____ PREC___ QUADNAME_____ QUADCODE_____
____T/____R/___S/___4S/___4/4 COMMUNITY SIZE (acres)_____
PLOT TYPES_____ PLTRL_____ PLOT W_____ SURVEY_____
PHOTOS_____Specim_____Specclas_____
DIRECTIONS -->_____

CONSERVATION RANKING

QUAL ___ Com: _____
COND ___ Com: _____
VIAB ___ Com: _____
DEFN ___ Com: _____
RANK ___ Com: _____
THREATS_____
MGMT:_____
OWNERPROT__PROT:_____

ENVIRONMENTAL FEATURES

DL_____ SOIL RPT_____
SOIL UNIT_____ SOIL TAXON_____
PM_____ LANDFORM_____ PLOT POS_____ SLP SHAPE_____ ASP_____
SLOPE %_____ ELEVATION _____ EROS POTENT_____ EROS TYPE_____
HORIZON ANGLE (%): N____E____S____W____ IPSLP_____ IPVAL_____
SPFE
GROUND COVER: ____S+___G+___R+___L+___W+___M+___BV+___O - = 100%
GROUND COVER DIST_____ ANIMAL USE EVIDENCE_____
DISTURBANCE HISTORY (type, intensity, frequency, season)--> _____

RIPARIAN FEATURES: Channel Width_____ Channel Entrench_____
Surface Water_____ Channel Depth_____ Dist from H20_____
Valley Floor Gradient_____Floodplain Width_____
Bed Material_____

GENERAL SITE DESCRIPTION (landscape condition and adjacent ct's)

FORM III. OCULAR PLANT SPECIES DATA

10/30/92
PltID
L____

PLOT NO. _____ NO. SPECIES ____ PNC _____

TREES Tot Cv___ MHt___
Tal Cv___ Med Cv___
Low Cv___ Grd Cv___ CC

T 1 _____/_____ ____
T 2 _____/_____ ____
T 3 _____/_____ ____
T 4 _____/_____ ____
T 5 _____/_____ ____

SHRBS Tot Cv___ MHt___
Tal Cv___ Med Cv___
Low Cv___ Grd Cv___ CC

S 1 _____/_____ ____
S 2 _____/_____ ____
S 3 _____/_____ ____
S 4 _____/_____ ____
S 5 _____/_____ ____
S 6 _____/_____ ____
S 7 _____/_____ ____
S 8 _____/_____ ____
S 9 _____/_____ ____
S10 _____/_____ ____
S11 _____/_____ ____
S12 _____/_____ ____

GRAM Tot Cv___ MHt___
Med Cv___ Low Cv___
Grd Cv___ CC

G 1 _____/_____ ____
G 2 _____/_____ ____
G 3 _____/_____ ____
G 4 _____/_____ ____
G 5 _____/_____ ____
G 6 _____/_____ ____
G 7 _____/_____ ____
G 8 _____/_____ ____
G 9 _____/_____ ____
G10 _____/_____ ____
G11 _____/_____ ____
G12 _____/_____ ____

FRBS Tot Cv___ MHt___
Med Cv___ Low Cv___
Grd Cv___ CC

F 1 _____/_____ ____
F 2 _____/_____ ____
F 3 _____/_____ ____
F 4 _____/_____ ____
F 5 _____/_____ ____
F 6 _____/_____ ____
F 7 _____/_____ ____
F 8 _____/_____ ____
F 9 _____/_____ ____
F10 _____/_____ ____
F11 _____/_____ ____
F12 _____/_____ ____
F13 _____/_____ ____
F14 _____/_____ ____
F15 _____/_____ ____
_____/_____ ____
_____/_____ ____
_____/_____ ____
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_____/_____ ____
_____/_____ ____
_____/_____ ____
_____/_____ ____
_____/_____ ____
_____/_____ ____
_____/_____ ____

FERN Tot Cv___ MHt___ Med Cv___
Low Cv___ Grd Cv___

BRYO/LICH Tot Cv___

COMMENTS (EODATA) --> _____

Appendix 6

Element Occurrence Records for *Peraphyllum ramosissimum* in the HMP Area.

PERAPHYLLUM RAMOSISSIMUM
SQUAWAPPLE
Occurrence Number: 005

Survey Site Name: HIXON SHARPTAIL PRESERVE

County: Washington

USGS quadrangle: MANN CREEK NW

Latitude: 442728N Longitude: 1165415W

TOWNRANGE:	SECTION:	MERIDIAN:	TRSNOTE:
013N005W	14	BO	SE4SW4

Location:
The occurrence is located about 0.5 mile south of Fairchild Reservoir. The reservoir is located approximately 14 miles NNE of Weiser, and is accessed via an unmarked, narrow, 4-wheel drive road that leads off the Mann Creek road about 0.5 mile south of the Adams Creek road.

Survey Date: 1996-05 First Observed: 1983 Last Observed: 1996-05

EORANK: B

Population Data:
1983: Plants common. 1989: Ca 200-300 individuals in fruit; good overall site quality. Observation by Roger Rosentreter, Idaho State BLM. 1996: Ca 200-300 individuals observed by Bob Moseley, Idaho CDC.

Habitat Description:
On S and W-facing slopes of popcorn-textured heavy clay soils; 25% slope. *Artemisia arbuscula/Agropyron spicatum* community with mixed shrubs. Associated with *Amelanchier alnifolia* and *Agropyron spicatum*.

Minimum Elevation: 3680 feet Maximum Elevation: 3800 feet Size: 5 AC

Land Owner/Manager: Bureau of Land Management; The Nature Conservancy

Ownership Comments: Lower Snake River District BLM, Cascade RA, and The Nature Conservancy's Hixon Sarptail Preserve.
Comments:

Protection Comments: Occurrence is located within the "Hixon Pasture" exclosure, a part of the Hixon Columbian sharp-tailed grouse Habitat Management Plan Area. A portion of the occurrences is contained within TNC's Hixon Sharptail Preserve.

Management Comments:

Specimens:
C. A. Wellner 2831 (ID) -- collection label reads "16 air miles NNE of Weiser, tributary of Sage Creek".

PERAPHYLLUM RAMOSISSIMUM
SQUAWAPPLE
Occurrence Number: 006

Survey Site Name: DEER CREEK

County: Washington

USGS quadrangle: MANN CREEK NW

Latitude: 442614N Longitude: 1165244W

TOWNRANGE:	SECTION:	MERIDIAN:	TRSNOTE:
013N005W	25	BO	NE4

Location:
Approximately 15 miles NNE of Weiser. Occurrence area is accessible via foot from the Deer Creek road. This road is a spur off of the Mann Creek road.

Survey Date: First Observed: 1980'S Last Observed: 1980's

EORANK:

Population Data:
1980's: No population information. Listed as a known site by Rosentreter (1986).

Habitat Description:
No information available.

Minimum Elevation: 3550 feet Maximum Elevation: feet Size:

Land Owner/Manager:
Lower Snake River District BLM, Cascade RA.

Ownership Comments:
May also be on nearby private land.

Comments:

Protection Comments:
Located within the Hixon Columbian sharp-tailed grouse Habitat Management Plan Area.

Management Comments:

Specimens:

PERAPHYLLUM RAMOSISSIMUM
SQUAWAPPLE
Occurrence Number: 007

Survey Site Name: SOUTH OF FAIRCHILD RESERVOIR

County: Washington

USGS quadrangle: MANN CREEK NW

Latitude: 442637N Longitude: 1165405W

TOWNRANGE:	SECTION:	MERIDIAN:	TRSNOTE:
013N005W	23	BO	SE4
013N005W	26	BO	NE4

Location: Approximately 14 miles NNE of Weiser, and 1.2 and 1.8 miles south of Fairchild Reservoir. Access is via foot from the end of the Deer Creek Road. This road is a spur off the Mann Creek Road.

Survey Date: 1996 05 30 First Observed: 1960-07-05 Last Observed: 1996-05-30

EORANK: C

Population Data: 1960-1983: No data from several collections. 1996: Two subpopulations. The northern subpopulation is comprised of about ten individuals. The southern subpopulation contains about 50 plants; with about 40 in a dense clump and 10 others widely scattered. All are severely hedged and less than three feet tall. Vigor is assessed as poor. All fruits aborted. Observation by Bob Moseley, Idaho CDC.

Habitat Description: Xeric sagebrush/bluebunch wheatgrass habitat type in mid-seral condition. Bulbous bluegrass and cheatgrass are common. Other associates include *Sambucus cerulea, Purshia tridentata, Agropyron spicatum, Balsamorhiza sagittata, Lupinus laxiforus, Achillea millefolium*, and *Lomatium dissectum*. Dry, south-facing slope hillside.

Minimum Elevation: 3600 feet Maximum Elevation: 3650 feet Size: 2 ACRES

Land Owner/Manager: Bureau of Land Management; private land

Ownership Comments: Lower Snake River District BLM, Cascade RA; private land.

Comments: Bob Mosely clarified the location of this occurrence during field work conducted for the Hixon Columbian sharp-tailed grouse Habitat Management Plan Area vegetation map project.

Protection Comments: Located within the Hixon Columbian sharp-tailed grouse Habitat Management Plan Area.

Management Comments:

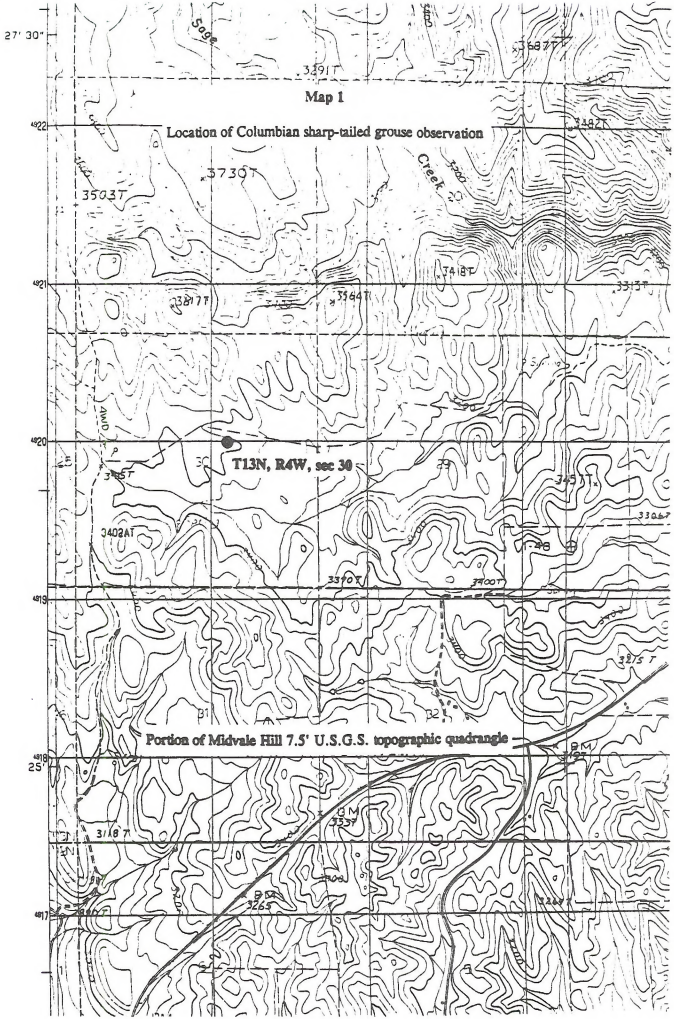
Specimens:
V. Saab 194 (CIC) - collected 9/1/83; T. Stevens 126 (CIC) - collected 7/5/60; R. D. Bratz s.n. (CIC) - collected 5/5/61.

Appendix 7

Location of sharp-tailed grouse observations in the HMP Area.

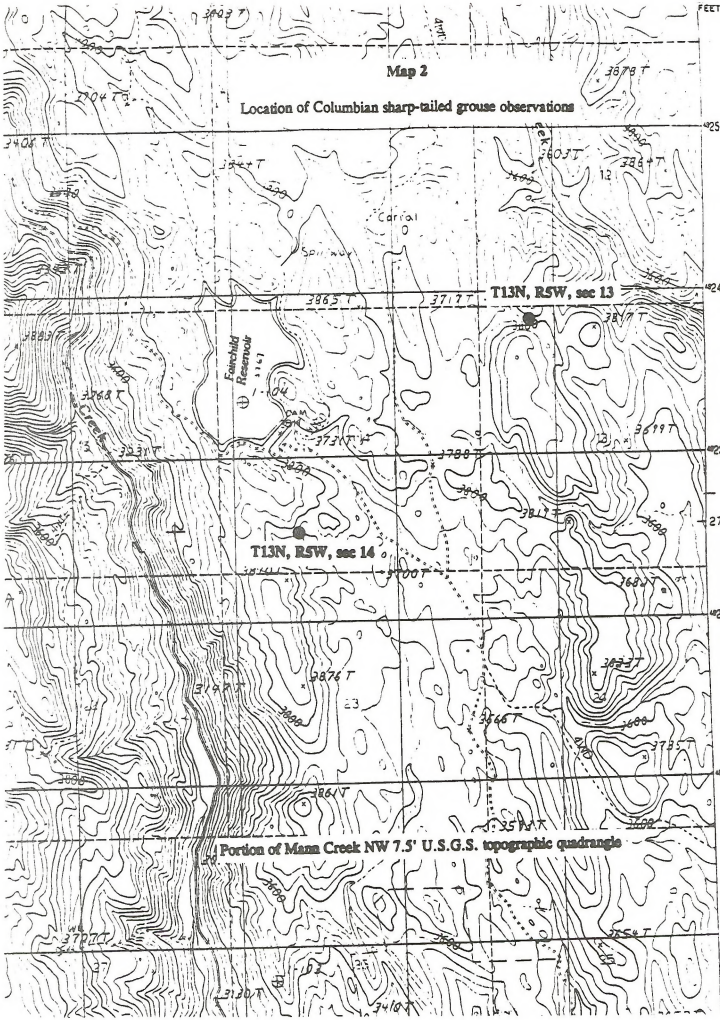
Map 1. Portion of Midvale Hill 7.5' U.S.G.S. topographic quadrangle.

Map 2. Portion of Mann Creek NW 7.5' U.S.G.S. topographic quadrangle.


Map 1
Location of Columbian sharp-tailed grouse observation
T13N, R4W, sec 30
Portion of Midvale Hill 7.5' U.S.G.S. topographic quadrangle
Sage
Creek
27' 30"
25'

Map 2

Location of Columbian sharp-tailed grouse observations



Portion of Mann Creek NW 7.5' U.S.G.S. topographic quadrangle

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Cal Groen, Chief
Natural Resources Policy Bureau

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Vegetation of the Hixon
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